CURRENT TRENDS
IN PSYCHOLOGY

Eight lectures
under the auspices of
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of the University of Pittsburgh
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in the Stephen Collins Foster Memorial

CURRENT TRENDS
IN PSYCHOLOGY

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PREFACE

DURING World War II every psychologist had a job to do. His contributions sometimes were made in uniform and sometimes in whatever vestless and cuffless suit was available. Whether in uniform or not, the psychologist's work was related to the war effort or to the essential war functions of the nation.

When the war ended, the psychologist found that his responsibilities were no less urgent. For the future his prospects seem to be even heavier burdens and a never-ending path.

Since the years 1940 and 1941, the psychologist has shown himself capable of performing duties not previously allotted to him, or, for that matter, not previously delegated to anyone else. There has grown up a better understanding of the potential functions of the psychologist, an understanding which creates new assignments for him. Instead of a reluctance to intrust to him problems in human behavior, there is today an insistence that he attempt problems with which perhaps he is not yet prepared to deal.

Clearly these past few years have been an era of great change in psychology, as they have in many other fields. It is unfortunate that during these dramatic and eventful times, there were few professional meetings

and little time or opportunity for the discussion of professional problems.

With the return of the possibility of holding professional meetings, it occurred to us that a symposium on current trends in psychology would be most timely and desirable. With the cordial support of the administrative officials of the University, we were able to hold at the University of Pittsburgh, on March 5 and 6, 1947, a conference on current trends in psychology. The present volume contains the papers delivered then.

In planning our program we attempted to include in it discussions of recent advances and of probable future developments in several fields of psychology. There necessarily was a limit to the number of fields which could be included. In each chosen area of psychology we selected a speaker who is now active in that field.

The conference proved to be an intensely stimulating one to those who took part. We hope that the papers here printed will carry with them some of that stimulation, even though stripped of the discussions, both public and informal, which they engendered in the audience and among the speakers. It is our hope that we can bring about, from time to time, a repetition of the type of intellectual experience which was created by the conference by holding similar conferences on other topics in psychology and its related fields.

WAYNE DENNIS

University of Pittsburgh
June, 1947

CURRENT TRENDS
IN PSYCHOLOGY

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PSYCHOLOGY AS A PROFESSION

Wayne Dennis

THE purpose of this conference is to set ourselves the task of thinking about what psychology is doing now and what it will do in the future. I suppose no one will doubt the appropriateness of this task. There is need for a professional stocktaking and planning in psychology. This need arises in part from the new demands made upon psychology during the war and from the further demands being made upon it in the post-war period. At present there are unparalleled requests for services from psychology. We do not know to what extent such requests will continue. We do not know whether or not a sufficient number of psychologists is being trained. These are some of the problems which will occur to anyone who thinks about the present situation in psychology. These and other problems will, no doubt, be discussed in the course of this conference.

It will not be denied that a conference such as this has a sufficient number of questions with which to concern itself. It may be doubted, however, that a conference can accomplish much toward providing answers to these questions. Let me hasten to indicate that we—and I believe I speak for the other participants as well as for myself—are not so presumptuous as to propose that we can provide answers to the problems facing psychology today. These must be supplied by

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the entire body of psychologists, not by a few. If a few men *could* formulate effective plans for the many, they would still be under the necessity of obtaining from the many understanding and support for their solutions. What we propose to do here is to provide an opportunity and an occasion for a discussion of professional problems by a small segment of the psychological world. We hope that many discussions similar to this will take place in the future. This conference may originate a few new ideas or cause a few modifications of old ones; it may result in a slightly greater dissemination of information and attitudes within the profession; it may bring about some minor harmonizations of divergent viewpoints; or it may clarify slightly the issues with regard to some opposing principles. If any of these things come about, and if these contributions should stimulate others to further contributions, we shall indeed be pleased with our results.

It is not possible, of course, to discuss all the current trends and all the probable future developments in psychology. A reasonable limit to our scope must be set. We have invited seven speakers, each one to discuss current trends in a field of psychology. Each speaker is an acknowledged leader in the field on which he has been asked to speak. At the close of each lecture the members of the audience will be given an opportunity to ask questions, to make comments, and to present viewpoints of their own. We hope that this will be a real conference, in that the audience will participate in the proceedings. Tomorrow afternoon, following the last address, there will be a final summarizing round table

or discussion by our speakers and by the audience. Invitations to this conference have been issued only to those with a professional interest in psychology or in some related field. This fact should enable us to speak freely and to assume a background in psychology for every member of the audience.

As I have indicated, each speaker will discuss some field of psychology. In addition to the trends and problems in various fields of psychology, there are considerations which face psychology as a whole. I think we should not overlook general problems in directing our attention to various fields. Therefore, by way of bringing these to our attention, and by way of opening our conference, I wish to discuss some of the problems which face psychology as a profession at the present.

I believe it eminently proper that we should be deeply concerned with our own professional problems. To be occupied with such matters need not mean that we are ingrown bores or that we suffer from an occupational introversion. We must keep in mind that we are a very special group, having a very special function. We represent the science of human behavior, the art of management of human relations. We are expected to excel in the solution of human problems. If we cannot succeed in solving our own professional problems, we will be as suspect as would be a group of ophthalmologists who had not corrected their own errors of refraction. Since we cannot solve our own problems unless we direct our attention to them, the first task is to ask ourselves what are the problems which need solutions.

I wish to propose that psychology today requires

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prestige and respect for its successful existence as a profession. We cannot function effectively as advisers and consultants, or as researchers in human behavior, without holding the confidence and good opinion of a considerable part of the population. This need not be true of men in some other occupations. A pawn-broker, for instance, may be successful without having prestige or respect. No doubt other examples could be given. Probably some individual psychologists can reach success of some sort without prestige and respect, but I believe psychologists as a whole can function in the future only with general public approval. I would advocate that we ought systematically to attempt to gain the good will and the good opinion of large numbers of citizens. In obtaining professional prestige several professions, including the medical profession, have employed much better techniques in public relations than have we. That we have not been equally successful in our public relations does not reflect favorably on our professional skill. I do not mean to imply that the public has a poor opinion of us, but that whatever the opinion is, it has come about in a haphazard and unplanned way. At present, we have few data concerning prevailing information and opinion of the public with regard to psychology, although we have such data with regard to other occupational groups.

In this matter, we have been either overmodest or negligent. In conducting studies of the prestige ratings of various occupations, the psychologist has seldom included his own name. The psychologist, of all people, should know whereon he stands, whether it be on

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Gibraltar or quicksand. I suggest that a comprehensive survey of the knowledge and opinions about psychologists would be very much in order at the present day. Perhaps Dr. Likert will have some comments on this topic. Perhaps he already has some data concerning the information and attitudes about psychology. If he does not have, I recommend this subject to the attention of the Policy and Planning Board of the American Psychological Association with the suggestion that they find means of remedying our ignorance.

The topic of public opinion was introduced because it seems to me that the prestige of psychology is one of the major problems facing us today. I hope I will not be intruding upon the ground to be covered by our other speakers if I discuss it somewhat further.

The prestige of a profession depends upon many things, but certainly in large part upon its members. Rather, I should say, it depends upon the reputation of these persons whom people think of as being its members. Unfortunately at the present time, we cannot control who shall become associated in the public mind with psychology. We have no means of controlling the use of the title "psychologist." In most states a man cannot call himself an electrician unless he has been certified by the state, and certainly not a veterinarian unless he is licensed, but anyone can call himself a psychologist. Not only can he call himself a psychologist, he can attempt the functions of a psychologist and seek employment as a psychologist. Recently a bill has been introduced into the legislature of Pennsylvania proposing the licensing of baby sitters. It is

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dangerous, we are told, to leave your child with just anyone who calls himself a baby sitter. It is also dangerous to take your child to just anyone who calls himself a psychologist. If the state protects its citizens by licensing or registering plumbers, barbers, and beauticians, we do not seem out of order in proposing that it also protect its citizens from self-appointed and untrained or poorly trained psychologists.

The problems arising from the lack of regulation are becoming serious. As was indicated earlier, there is today a much greater demand for the services of persons called psychologists than ever before. This demand leads to exploitation. Persons with little or no training in psychology call themselves psychologists in order to get the financial and personal benefits which come from the name. I know personally of several instances concerning self-styled psychologists in and around Pittsburgh, and I know that like instances occur elsewhere. Since these people are not well selected and not well trained, their services are almost certain to prove unsatisfactory. The average citizen, not knowing how to distinguish a psychologist from a pseudopsychologist, may conclude that all are pseudopsychologists.

Not only is the public entitled to a degree of safety from impostors and charlatans but the trained psychologist is entitled to protection from damage to his professional reputation. This protection already obtains with respect to most professions and to many trades; it should obtain in psychology. That it does not is due, in part, I believe, to the fact that until

recently most psychologists were college or university professors. The temptation to assume the title of psychologist was small. No one ever impersonated a college professor as a way of obtaining a good income. Now that more lucrative positions are open to psychologists, impersonations are becoming more common. I believe our backwardness in regard to regulation arose because psychology in the past has been dominated by academicians, but also because a considerable number of the colleges and universities to which these professors have been attached have been in small towns or in relatively small cities. In small towns certification is not necessary because the population is small and stable. Nearly any resident of a college town can easily ascertain the status of a person who calls himself a psychologist. In a large city this is not so easy. Lately there has been an increase in the number of psychologists in metropolitan centers, both inside and outside universities. This trend in time will increase the demand for certification, licensing, or similar practice.

This is hardly the time or place to discuss the details of the way in which the name of psychology should be protected. We need first of all to agree that it should be safeguarded. We should present a common front. Unless we are united we cannot win our point.

It is necessary first of all that we reach common definition with regard to what a psychologist is. There may be the rub. We may not be able to reach an agreement.

At the risk of offending those members of the audience who do not have the doctoral degree, I wish to suggest that the only practicable way to define a trained

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psychologist is by denoting him as a person who has the Ph.D. degree in psychology, or who is a fellow of the American Psychological Association. Undoubtedly there are some very well-qualified people who as yet do not meet these standards. We must keep in mind that there are some persons well qualified in certain aspects of medical science who do not have the M.D. degree. But a line must be drawn somewhere. The physicians have drawn theirs. We, too, must draw one, and I believe it must be one which is simple and unequivocal, even if occasionally it is unjust.

It is likely that some of you will feel that different kinds of psychologists should be certified differently; that is, that a person not be designated as a psychologist in general, but as a clinical psychologist, or a personnel psychologist, or some other type of specialist in psychology. I wish to object to this point of view and to urge that the highest professional certification bear the simple title "psychologist." For one thing, the distinctions between various specialties are by no means clear cut. Does clinical psychology include vocational appraisers, vocational counselors, and school psychologists? If so, does it include the personnel psychologist who does an intensive case study of an applicant for a responsible position? Does it include the military psychologist who served in a professional capacity on a selection board? I believe it is easier to determine who is a psychologist than it is to determine who is a particular kind of psychologist.

In the second place, even if distinctions acceptable to psychologists can be arrived at, it will not be feasible

to educate the average citizen, or even the members
of other professional groups, with respect to these dis-
tinctions. It is sufficiently difficult to train the college
student to distinguish a psychologist from a psychi-
atrist, a psychoanalyst, a spiritualist, or a phrenologist.
We cannot undertake in addition to get across to many
people the distinctions between several kinds of psy-
chologists. It would seem better to entrust to each re-
sponsible member of the profession the duty of refer-
ring a psychological problem with which he is not
equipped to deal to another psychologist in whose field
of competence the problem lies. This practice obtains
to a considerable extent today.

A third reason for proposing some kind of general
classification of psychologists as psychologists is the
degree of mobility among the so-called specialties. We
have child psychologists who used to be animal psy-
chologists, clinical psychologists, who formerly were
experimental psychologists, industrial psychologists
who were educational psychologists, and so forth. Such
change in specialization seems to me to be legitimate,
and to show that given a general training in psychology
the field of specialization may readily change.

Finally, the unity of psychologists should be kept in
mind. The drawing of lines, the demarcation of duties
is likely to lead to jealousy, rivalry, and disunity. Juris-
dictional disputes may even develop. It would indeed
be disastrous if we had a war between the clinical psy-
chologists and the vocational counselors comparable
to Pittsburgh's beer war between rival unions. I am
afraid that the establishment of many distinct classi-

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ficatıons would cause a trend in that direction. Strength lies in developing among all psychologists a feeling of belonging to the same profession.

Not only must we be able to determine who shall be admitted to our profession; it is important that we set the admission standards very high. For example, nothing is gained by requiring the Ph.D. degree if the degree may be obtained by anyone. In the past psychology has had some excellent people, but it has had a share of second-rate intellects, of eccentrics, and of fuddy-duddies. Psychology may owe a service to these people, but it does not have to take them into its fold. In terms of its effectiveness, it cannot afford to do so. To succeed as a profession, we must have a highly selected personnel.

Within recent years, attention has been directed on several occasions to the fact that in certain respects psychology has not been practicing what it preaches. One of these is personnel selection. We have developed methods for measuring the effectiveness of the individual in his position. We have developed ways of constructing tests which may be checked against later criteria of occupational fitness so that, after an evaluation period, we are able to predict success on the job. We urge other people to make use of these procedures, but we have not, by and large, applied them to our own profession. Whatever selection measures a graduate department of psychology may now use, it must be admitted that they are almost totally unvalidated.

Fortunately, the situation in this respect is beginning to change. Many departments are instituting selection

procedures, and are planning follow-up studies to measure their validity. In clinical psychology, an inter-university research project of this character, financed by the Veterans Administration, is being directed by one of our speakers, Dr. E. Lowell Kelly. It is likely that the National Research Council will initiate soon a study of professional competence and of selection methods for research scientists which will include research psychologists. These are promising beginnings.

In the long run these projects and others of the same character should have very important consequences for us. Since personnel selection methods without doubt belong to psychology, psychology should be able to use them effectively in its own behalf. We are fortunate in being trained in selection procedures; we are also fortunate in being so placed in the educational world that we can select our own recruits early in their college career. It should be possible, after a few years, to find in the freshman classes of our universities the very best human material for psychology, and it should be possible to interest the young men and women who have the needed abilities and personality traits to enter our field. We will be remiss indeed if we do not avail ourselves of the opportunity which is ours to encourage new members of our profession from among those best fitted for it. It lies within our grasp to demonstrate the contributions which psychology can make to what Dr. Flanagan has called the "effective use of human resources." It is within our power to determine what kinds of individuals make the best psychologists and to have psychologists of the future chosen from among

those individuals who are best suited to these duties.

What traits are required of a successful psychologist must of course be determined by research. It is no hazardous guess, however, that personality characteristics will prove to be very important. If this should be so, selection on this basis will pose some problems of educational policy. Our graduate schools almost without exception state their entrance requirements purely in terms of academic abilities and academic achievements. It may be difficult to change admission policies so that personality traits and abilities other than those required for academic success, particularly the abilities required in dealing with people, are taken into account. Not only entrance requirements, but requirements for advanced degrees, too, must be phrased in terms other than the knowledge of textbook material, if the aims which I have discussed are to be attained. We will need to develop achievement tests which will require the student to demonstrate his skill in teaching, in research, in clinical procedures, and in human relations to replace in part the written examinations upon which we have depended in the past.

Problems of professional personnel are not encompassed by selection and measurement. No matter how excellent our testing techniques may be, we have problems of training. In this regard, we should not limit our thinking to the graduate level. Courses in psychology are taught not merely to future psychologists but to nearly all college students in the country. The problems of the most effective ways of teaching in psychology are tremendous in their scope.

PSYCHOLOGY AS A PROFESSION

It does not require a careful national survey to determine that in the classrooms devoted to teaching of psychology today at least 90 per cent of the time is given over to lectures. It is not to the credit of teachers of psychology that they are perpetuating an educational method which arose before the invention of printing, not to mention the inventions of the past one hundred years. Lecturing developed at a time when no educational equipment existed except quills and paper. Paper is still used to such an extent in college and university teaching that modern industry cannot produce enough to meet current demands. That the quill recently has been modified in the direction of writing under water for twenty years is by no means proof that it is a good piece of educational equipment. Big and powerful social institutions have been known to perpetuate antiquated ideas and methods. This year hundreds of thousands of bright young men and women sit in college and university classrooms listening to lectures because a tradition for this type of activity became established and accepted in the early European universities several hundred years ago.

The psychologist is no more addicted to lecturing than are other teachers in institutions of higher education. He is caught in the same educational machine as are the others. But since one of the tasks of a psychologist is to investigate the learning process, he ought to be less bound by traditional learning procedures and to be more imaginative and inventive. He ought to tinker more with the educational machine. He has taken the lead in the introduction of tests of educative capacity

and in the measurement of the results of education. He has done relatively less, though he has done something, to improve the techniques of education. Particularly in the teaching of psychology his responsibility is clear.

I cannot present a complete plan for replacing the lecture system, but I am sure that such a plan should be presented. All of our studies in the psychology of learning will indicate the inadequacy of most of our present classroom procedures. Yet we continue to use them as if we did not believe our own researches.

To be sure, to introduce other methods may mean a revolutionary change in university methods. This revolution struck the kindergartens some years ago, and it is long overdue in university circles. Psychologists should be leaders in this revolution. To improve university methods of education would be a type of revolution which would bring dishonor to no one. Unless we houseclean our own teaching and training methods, we cannot maintain a good reputation in our field.

A great deal of what I have had to say indicates that psychology is very much under test at the present time. People expect a great deal of us. I think this is rightly so. The science of human behavior cannot exist as a second-rate science. It must be first rate. We have been excused of some weaknesses and peculiarities in the past because we were young and growing. Now we are large and reasonably mature. One of the most urgent problems facing us is to maintain very high standards within our profession, and to produce high achievements.

In the past, many of the contributions of psychology

have consisted in correcting popular misconceptions. Let me give some minor examples: we have shown that blonds and brunettes do not differ in personality in the ways in which some people have supposed, that mental exercise does not strengthen the memory, and that bulls are not infuriated by the color red. Our contributions often have been critical of the other man. We say that employers do not use sound selection procedures, that parents do not rear their children properly, and that the minister's sermons are ineffective.

I wish to suggest as a general future trend with reference to our own professional problems that we frequently turn our criticisms toward ourselves and that we ourselves make full use of our own positive and creative contributions. These have been many. Now is a propitious time to apply psychological methods and psychological principles to the strengthening of our profession. If we do so, we can make psychology one of the most competent professions. Making it one of the most competent professions is essential to its attaining the social usefulness which I am sure all of you foresee as its function.

Psychology today has unlimited potentialities. What potentialities will be realized depends in large part upon our personnel, its selection, its training, and its organization. If we devote a share of our talents and skills to our own professional problems and do not give all of our attention to schizophrenics, parents, businessmen, engineers, aviators, and others, I am sure our long range contribution will be greater. I have confidence that this is the course which psychology will pursue.

EXPERIMENTAL PSYCHOLOGY

B. F. Skinner

THERE is a familiar caricature of the experimental
psychologist which runs something like this: He
is first of all an apparatus man, who spends a good
share of his time tinkering with sundry pieces of
equipment which never quite work to his satisfaction.
He investigates only problems which he calls appropri-
ate to the laboratory. He cannot study learning as part
of the complex and subtle interplay of behavior and
environment in everyday life, so he confines himself
to the memorizing of meaningless words presented
with clocklike regularity in a standard aperture. He
cannot bring love or hate or envy into the laboratory,
so he investigates reactions to garter snakes and pistol
shots. The only strong motives he knows are his own,
for his subjects perform merely to oblige him or be-
cause they are required to do so as part of a course they
are taking. (In an exceptional case, if he "has a grant,"
they may be paid seventy-five cents an hour.) He
remains an experimental psychologist only so long as
his problems have no practical value; that is how he
stays pure. If his field suddenly becomes important for
industry or the public weal, then he becomes an indus-
trial or applied psychologist and does the whole thing
over again in no time at all with better and more expen-
sive apparatus. He works only with amenable subjects

—that is to say, with subjects in whom no one is really interested: white rats or dogs or human beings who have stepped out of their normal lives and into a laboratory frame as standard organisms.

The picture is not as amusing as it may seem. Parts of it are perhaps too close to the truth to be funny, and whether justified or not the general tone is disturbing. It supports a conviction, which most of us have reached on the strength of other evidence, that experimental psychology is passing through a critical phase in its history, and that it is under close and not always sympathetic scrutiny. Psychologists who take a broader interest in the affairs of men have grown impatient with their experimental colleagues, if not openly critical. They often appear to resent the historical seniority of the experimental field and the prestige which seniority has engendered. The experimental psychologists themselves have grown uncertain of their scientific position. Their confidence has been shaken, and desertions from the ranks occur more and more frequently.

This does not mean that a great deal of what may properly be called experimental psychology is not still going on, or that the results are not duly published in the journals. It would be possible to write a paper on "Current Trends in Experimental Psychology" by describing the latest improvements in techniques, by reporting the most important recent advances, and so on, and such a paper would not suffer from any shortage of material. But the important issue is the survival of the field itself, or at least its ultimate position with

respect to other branches of the science. This ought to have first claim upon our attention.

The very definition of experimental psychology is in doubt. It is always easy to overemphasize some incidental or superficial feature. For example, there is no reason why we should suppose that experimental psychology is concerned with a special subdivision of human behavior. At one time, it is true, experimentalists were dedicated to a limited subject matter, particularly the fields of sensory processes, reaction times, and certain limited learning situations, but this is no longer so. Experimentation is now common in every field of human behavior. Nor is the experimental psychologist any longer distinguished by the fact that he uses apparatus. It is characteristic of him that he is not satisfied to observe behavior with his eyes and ears alone, but must connect his subjects to amplifiers and recorders of one sort or another. Characteristically, too, he does not take the environment simply as he finds it, but modifies it in various ways with various ingenious devices. He was once almost alone in these practices, but virtually every sort of investigator now adopts them from time to time. The use of apparatus may improve an experiment, but it must not be confused with experimentation itself. It is possible to be an experimentalist without using apparatus at all. It is also not true that experimental psychology necessarily deals with something less than the whole man in something less than the real world. To simplify the material of a science is one of the purposes of a laboratory, and simplification is worth while whenever it

does not actually falsify. But the experimental psychologist has no corner on simplification. The psychoanalytic couch is a simplified world, and so is any test situation.

Since the experimental psychologist is no longer distinguished by a special field of research, or by his technical equipment, or by laboratory simplification, still another historical distinction must be given up: his statements are not necessarily more reliable than those of anyone else. At one time this might have been regarded as the essential difference. Experimental psychology stood for precision versus casual observation, for experimental validation versus general impression, for fact versus opinion. Most of what was said about human behavior in education, public affairs, industry, letters, and so on, was on the other side. The experimental psychologist was distinguished by the fact that one could trust his statements, no matter how limited their application. Elsewhere one expected nothing more than casual or philosophical discourse. But this is no longer true. Statements of comparable validity are characteristic of most of the fields represented in this conference and may be found in other and still larger spheres of human behavior. Rigorous definition, careful measurement, and validation no longer comprise a sufficient criterion; and even the consolation that the experimental psychologist was at least first to take these matters seriously will not suffice for a current definition.

We can make some progress toward delimiting a field of experimental psychology which is not merely

an historical accident by looking more closely at the word *experimental*. In psychology, as in any science, the heart of the experimental method is the direct control of the thing studied. When we say, "Let us try an experiment" we mean, "Let us do something and see what happens." The order is important: we do something first and then see what happens. In more formal terms we manipulate certain "independent variables" and observe the effect upon a "dependent variable." In psychology the dependent variable, to which we look for an effect, is behavior. We acquire control over it through the independent variables. The latter, the variables which we manipulate, are found in the environment. We manipulate them when we stimulate an organism, when we alter conditions of motivation or learning, and so on. The great majority of psychological experiments can be reduced to this form. There may be variations on the theme: in sensory psychology, for example, we may wish to see how far we can change the environment *without* changing behavior, as when we study difference limens. But the basic pattern of control remains the same.

This is a narrow definition of an experimental science. It does not identify "experimental" with "scientific." Physics, chemistry, physiology, and genetics are experimental sciences in this sense. Astronomy, geology, and taxonomical biology would not generally qualify. This is no reflection upon the latter. We are merely classifying them according to methodology. The classification is worth making because the psychologist is more likely to find common prob-

lems and common solutions among sciences which have the same formal structure.

One interesting consequence of defining experimental psychology as a branch of the science in which we control the variables which govern behavior is that we thus exclude most investigations using correlational methods. It may be possible to prove the existence of a functional relation of the sort here in question by running a correlation between some aspect of behavior and some aspect of the environment, but if we are able to manipulate the aspect of the environment, letting it take different values at different times, we can get a much more complete account of the relation. The experimental control or elimination of a variable is the heart of a laboratory science, and, in general, it is to be preferred to manipulation through statistical treatment. It is not a question of a choice of methods, however. The two approaches represent different scientific plans and lead to different results. It is curious that our definition should single out the kind of result which has been traditionally accepted as characteristic of the field of experimental psychology. A possible explanation of why it does so will appear later.

A line drawn between functional and correlational analyses will run approximately along the accepted boundary between pure and applied psychology. If this were not an accident we might seize upon it in order to replace the distinction between the useful and the useless—a distinction which is not exactly flattering to the pure scientist. But the agreement is rough and

accidental. Correlational techniques have been extensively used in pure research, and the reason they have dominated the science of psychology in its application to education, industry, public affairs, and elsewhere, is not that the processes to be dealt with in those fields are of any special nature, but that it has generally been impossible to give an account of relevant factors in any other way.

The special problem of the applied psychologist is a practical one. He must gain control of certain relatively complex material—if not directly, as in the laboratory, then indirectly and frequently after-the-fact through statistical procedures. He is not confronted with any special sort of psychological fact for which a special method is required. The preference for correlational techniques in applied psychology may therefore change. It has been true of technology in general that as the basic engineering problem is solved, as the applied scientist gains control of his material, the connection with pure or laboratory science is strengthened. Common methods and common terms can be adopted. Something of this sort may be expected in psychology as engineering control is improved.

It is a familiar complaint that the kind of control possible in the laboratory is impossible in the world at large. The argument is that we cannot modify a natural environment in subtle ways or measure normal unhampered behavior to thousandths of a second. The complaint is especially loud with respect to the laboratory study of animal behavior. The fact that sciences like physiology, embryology, and genetics are very

largely concerned with the study of animals and yet yield results constantly applied to men is dismissed as beside the point. Even though behavioral processes may be essentially similar in man and rat, it is argued that men cannot be similarly controlled, and that the results of the animal laboratory are therefore worthless when applied to the larger problems of human behavior.

This position is bound to grow weaker as the applied sciences grow stronger. It is not true that human behavior is not controlled. At least we cannot proceed very far as scientists on that assumption. To have a science of psychology at all, we must adopt the fundamental postulate that human behavior is a lawful datum, that it is undisturbed by the capricious acts of any free agent—in other words, that it is completely determined. The genetic constitution of the individual and his personal history to date play a part in this determination. Beyond that, the control rests with the environment. The more important forces, moreover, are in the social environment, which is a man-made environment. Human behavior is therefore largely under human control.

Except for the trivial case of physical restraint or coercion, the control is, of course, indirect. It follows the general pattern of altering a dependent variable by manipulating the independent variables. Now, there are many cases in which the independent variables are freely manipulable with respect to human behavior. In the nursery, in certain types of schools, in corrective and penal institutions the degree of con-

trol may be very great. Although there are certain legal and ethical restrictions, the kind of manipulation characteristic of the laboratory is quite feasible. Elsewhere—in education, industry, law, public affairs, and government—the control is not so likely to be lodged in a single person or agency. Here, the basic engineering problem is to acquire control. But we must remember that the problem has frequently been solved— perhaps as often as not to our sorrow.

Since human behavior is controlled—and controlled, moreover, by men—the pattern of an experimental science is not restricted in any way. It is not a matter of bringing the world into the laboratory, but of extending the practices of an experimental science to the world at large. We can do this as soon as we wish to do it. At the moment psychologists are curiously diffident in assuming control where it is available or in developing it where it is not. In most clinics the emphasis is still upon psychometry, and this is in part due to an unwillingness to assume the responsibility of control which is implied in guidance and counseling. Most personnel psychologists still obtain men with desired capacities or personalities by selecting them from a larger population rather than by creating them through training and guidance. In education we design and re-design our curricula in a desperate attempt to provide a liberal education while steadfastly refusing to employ available engineering techniques which would efficiently build the interests and instill the knowledge which are the goals of education. In some curious way, we feel compelled to leave the active

control of human behavior to those who grasp it for selfish purposes: to advertisers, propagandists, demagogues, and the like.

This diffidence in accepting control has had far-reaching consequences. It is doubtless to some extent responsible for the continued effort to analyze behavior into traits, abilities, factors, and so on. The end result of such a program is a description of behavior in terms of aspect rather than process. It is a static rather than a dynamic description, and again it is primarily a correlational rather than a functional. No one doubts the value of investigating relations between ability and age, intellect and socio-economic status, emotionality and body type, and so on. The results may have important engineering applications. But so far as the single individual is concerned, we do not then proceed to *alter* age, or body type, or socio-economic status. Relations of this sort may make us more skillful in using the instruments of control already in our possession, but they do not help us to acquire new instruments. No matter how satisfactorily we may demonstrate the reality of abilities, traits, factors, and so on, we must admit that there is little we can do about them. They give us an aspect description of behavior which may have a practical value in classifying or selecting the members of a group, but they do not carry us very far toward the control of the behavior of the individual. That control requires techniques which are peculiarly experimental in nature, according to the present limited definition, and we may therefore anticipate that as soon as applied psychology

emphasizes active control, the experimental pattern will emerge.

Our definition of the experimental field is therefore not yet complete, since it does not exclude the applied interest in functional control. But a final distinction can now be made. It concerns the use to which the control is put. What the experimental psychologist is up to when he is being essentially experimental is distinguished from other fields of psychology by the fact that he has a special goal. We need not blush to express this in rather general terms. The experimental psychologist is fundamentally interested in *accounting for* behavior, or *explaining* behavior, or in a very broad sense *understanding* behavior. If these are synonymous expressions I have been redundant and I apologize. If each carries its own special shade of meaning, then all three, taken together, will come nearer to an adequate statement. In any event, we must try to be more precise.

We do not understand a thing simply by becoming familiar with it. Nor is it enough to be able to describe it, no matter how specific or subtle our terms may be. We make some progress toward understanding anything when we discover how it is related to other things, especially to antecedent events. This is what the layman means by cause and effect, and the satisfaction which he feels when he discovers the cause of an event is probably not to be distinguished from the satisfaction which the scientist takes in demonstrating a functional relationship. The discovery that the environment, in acting upon the organism, could be

regarded as a causal agent in the direction and control of behavior, and the realization that it was therefore possible to dispense with fictitious inner controls marked the beginning of a science of behavior. This was as much the spirit of the sensory analysis of mind begun by the British Empiricists as it was the spirit of Descartes and the later analysts of action.

But the cataloguing of functional relationships is not enough. These are the basic facts of a science, but the accumulation of facts is not science itself. There are scientific handbooks containing hundreds of thousands of tabulated facts—perhaps the most concentrated knowledge in existence—but these are not science. Physics is more than a collection of physical constants, just as chemistry is more than a statement of the properties of elements and compounds. There is no better proof of this than the failure of simple fact-collecting to inspire the scientific worker. Most of the facts entered in our scientific handbooks are virtually hack work. Some were collected in the course of more rewarding scientific pursuits, but the tables are filled out only by the type of man who might otherwise be found collecting stamps or old coins. There is no more pathetic figure in psychology today than the mere collector of facts, who operates, or thinks he operates, with no basis for selecting one fact as against another. In the end, he is usually to be found doing something else, or perhaps nothing at all.

Behavior can only be satisfactorily understood by going beyond the facts themselves. What is needed is a theory of behavior, but the term "theory" is in

such bad repute that I hasten to explain. Psychology has had no worse theories than any other science, but it has had them more recently, and they have suffered in the light of our improved understanding of scientific method. No one today seriously uses a fictional explanation as a theory, but all sciences have done so at one time or another. That mercury stands at a certain height in a barometer because nature abhors a vacuum to exactly that extent, or that certain bodies move because they are possessed by a *vis viva,* or that a substance burns by giving off phlogiston are the kinds of theories whose demise marks the progress of a science. They are the sort of hypotheses which Newton refused to make, and most scientists have followed his example. But Newton himself demonstrated the value of a proper scientific theory.

A theory, as I shall use the term here, has nothing to do with the presence or absence of experimental confirmation. Facts and theories do not stand in opposition to each other. The relation, rather, is this: theories are based upon facts; they are statements about organizations of facts. The atomic theory, the kinetic theory of gases, the theory of evolution and the theory of the gene are examples of reputable and useful scientific theories. They are all statements about facts, and with proper operational care they need be nothing more than that. But they have a generality which transcends particular facts and gives them a wider usefulness. Every science eventually reaches the stage of theory in this sense.

Whether particular experimental psychologists like

it or not, experimental psychology is properly and inevitably committed to the construction of a theory of behavior. A theory is essential to the scientific understanding of behavior as a subject matter. But if we are to consider the current status of experimental psychology rather than its destiny, we must admit that it is at the moment in the midst of theoretical chaos. This is, in fact, the explanation of the present crisis. Many experimentalists obviously lack motivation and direction and find it difficult to impart either one to their students. Many of them have lost interest and are turning to other fields. This is not due to any lack of financial support. Our universities can still win out against industrial offers when that is the only thing at issue. Nor is it a question of the support of research, although many universities have not fully understood their responsibility in generating as well as imparting knowledge. The real difficulty is that the experimental psychologist is unable to do anything with the facts he has accumulated, and he sees no reason to accumulate any more. He lacks a professional goal.

Part of this difficulty can be traced to the fact that the two great explanatory systems which have held the psychological field for a hundred years are no longer paying their way. They have lost their power to integrate and illuminate the facts of the science and to inspire and motivate the scientific worker. The only research to which they now lead is a sort of desperate patchwork to keep the theories intact, and this is unsatisfying.

One of these explanatory theories is the notion of a

controlling mind. From our modern vantage point the essentially fictional nature of this explanation is clear. It is on a par with the abhored vacuum or the *vis viva* or phlogiston. Most of us like to feel that the ghost has been laid, and that we are free of mentalistic explanations. But the inner man, constructed of such stuff as dreams are made on, still flourishes. At least half the textbooks in psychology still talk about mental life, and few are successful in convincing the student that this can be reduced to the stuff which is dealt with in the physical sciences. In psychiatry the score would be almost a hundred to one in favor of an appeal to psychic determiners of behavior. Psychoanalysis has assigned names to at least three of these inner men, and it is the exceptional psychoanalyst who is willing to regard them as physical entities.

We cannot break away from these hoary practices simply by resolving to avoid theory altogether. We need a better theory. But this will be of a different sort and cannot be reached by patching up an old model. One current practice, for example, is to make the inner man more respectable by stripping him of what we may call his personification. He no longer exists as a complete person, but only as small fractions of his old self—as wants, drives, attitudes, interests, and so on. It is the exceptional writer who convincingly defines terms of this sort in a nonmentalistic way; and even if an operational re-definition is successful, the old theory may leave its mark in the structure surviving.

The other current explanatory theory flourishes with greater prestige and presumably in more robust

health. This is the physiological theory of behavior. The inner man is given neurological properties, with a great gain in scientific respectability. Psychiatry becomes neuropsychiatry, and psychology the study of the nervous system. It is difficult to attack this theory without seeming to criticize the physiological psychologist, but no criticism is involved. There are many precedents in the history of science for borderline disciplines. To integrate the facts of two sciences is an interesting and profitable endeavor. Eventually, we may assume, the facts and principles of psychology will be reducible not only to physiology but through biochemistry and chemistry to physics and subatomic physics. But this reduction is undoubtedly a long way off. The current theoretical practice which is objectionable is the use of a hypothetical neural structure, the conceptual nervous system, as a theory of behavior. The neurological references introduced into such a theory, like references to mental states, interfere with free theory building, and they produce a structure which is not optimal for the organization of behavioral facts.

The traditional physiological theory, too, eventually fails to motivate the psychologist. Valid neurological explanations of important psychological laws are not arrived at with a very rewarding frequency, and the investigations which they inspire have a tendency to lead to such a jumble of details that the original plan is lost sight of. We are all familiar with the type of graduate student who comes to study psychology full of enthusiasm for a science of behavior, who climbs

the physiological family tree through Berkeley, Hume, Wundt, and the moderns, and finds himself studying some detailed physiological mechanism. His motivation eventually flags when he sees that his current activities have only the most tenuous connection with his original interest in human behavior. Such a case history is only a scale model of the history of experimental psychology. No matter how critically we may now view the original program of a science of mind, we must admit that a great driving force was lost when the nervous system had to be brought in. Instead of the basic psychophysical relation, the object of research became the operation of specific physiological mechanisms. Generalized brain theories of the Gestalt variety and dimensional analyses of consciousness are efforts to bring together again the fragments of a science of mind, and to add something of theoretical interest to the study of the physiology of end-organs. But the spark has been lost.

If we try to put these two great explanatory systems in good scientific order through operational re-definition, we only succeed in dealing the *coup de grâce*. We can, of course, define "mind" in behavioral terms, and we can set up a conceptual nervous system for the representation of behavioral facts, leaving the specification of the actual neural properties until some later date. But in this way we eliminate all the explanatory force of the theories. An operational definition is possible in every case, but it does not necessarily lead to a satisfactory theoretical construct. Whatever its success, it spoils the explanatory fun.

The appeal to what we may call naive physiologizing,

like the appeal to psychic determiners, is made in an attempt to explain behavior by shifting to a different level of observation. These are "outside" theories, which account for one thing by pointing to something which is going on somewhere else at the same time. For this reason they cannot fill the need for a theory of behavior, no matter how carefully they may be extended or repaired. What is emerging in psychology, as it has emerged at some point in the history of most sciences, is a theory which refers to facts at a single level of observation. The logic of this is simple enough. We begin with behavior as a subject matter and devise an appropriate vocabulary. We express the basic protocol facts of the science in the terms of this vocabulary. In the course of constructing a theory we may invent new terms, but they will not be invented to describe any new sort of fact. At no time will the theory generate terms which refer to a different subject matter—to mental states, for example, or neurones. It is not the purpose of such a theory to explain behavior by turning to "outside" determiners.

The real achievement of such theory building is not easy to demonstrate because of the present confused condition in psychology. There is no generally accepted theory of behavior which will serve as an example. But the situation is not quite hopeless. A scientific theory is never fully subscribed to by all the practitioners of a science; if it were, there would be no further need for scientific effort. And while no explicit theory in experimental psychology today has more than a handful of adherents, in practice most psychologists respect cer-

tain underlying assumptions which constitute the beginning of an implicit theory. We realize how extensive this implicit theory is when we observe non-psychologists dealing with the same subject matter and see how they repeatedly violate our assumptions. We have, then, something to begin with by way of actual theoretical practice. We may also get a plausible glimpse of the future, for some of the features of an effective theory can be inferred from the nature of behavior as a subject matter and from comparable theories in other fields. It should, therefore, also be possible to evaluate the present status of psychology with respect to theory construction.

The first step in building a theory is to identify the basic data. It may be easy or difficult, depending upon the science. It was relatively easy, for example, to decide what events were to be taken into account in the Copernican theory of the solar system. Astronomers had observed the positions of the planets at given times; the theoretical problem was to relate these facts, not to identify them. In genetics, on the other hand, it is relatively difficult to discover what characteristics of an organism are valid genetic units. Psychology faces an even more difficult problem: what are the parts of behavior and environment between which orderly relations may be demonstrated?

· The layman has little difficulty in analyzing the behavior of himself and his fellow men. He breaks it into discrete acts. He may report, for example, that someone "watched a car until it passed out of sight." The statement conveys useful information at the level of

casual discourse, but is it necessarily a valid scientific description? The language of the kitchen may be of no use to the chemist, though the cook finds it meaningful enough. Anyone who has tried to analyze pursuit behavior knows the problem involved in orienting the eyes toward a moving object, and very much more than that is covered by the word "watch." And when the layman, with what seems like breathless daring, reports that someone "chose to remain silent," he stakes out a field that might suffice for a lifetime of research. The statement may be quite effective for practical purposes, but it will not necessarily suffice for a scientific description. For what is "choice"? Even the behavior involved in choosing between simple objects like cigarettes or neckties is complex enough. But what is happening when one "chooses to remain silent"? And in what sense is remaining silent to be regarded as behavior at all?

In practice psychologists define "response" in many ways—from muscle twitch to telic effect. In the latter case they present the physiologist with the baffling problem of how two responses executed by different parts of the body can be mutually replaceable in a lawful physiological train of events. It is a common current practice to dodge the problem by accepting some practical measure of behavior, often limited to a particular measuring device, such as "maze performance" or some arbitrary criterion of "success." The physiologist has also been appealed to, but in vain, since an indication of the presence or absence of activity in a particular effector is of little help.

We cannot continue to leave the problem unsolved if we are to construct an effective theory. It may be that the notion of a unit of response is at fault and that a final statement will reflect the fluidity and continuity of behavior as a whole. This would require more powerful analytical tools, but it may be necessary. A further requirement must also be recognized; it is not the mere form of behavior that we undertake to predict but rather its occurrence. Expressions like "reaction tendency" or "excitatory potential" have attempted to take account of this fact. The end term in a theory of behavior, in short, is the probability of action.

In the companion problem of the environment, the layman again shows an enviable talent, for he describes and analyzes the environment with no hesitation whatsoever. The world to him is simply a collection of *things*. But his success gives the case away. He has analyzed the environment in terms of its practical importance. This is justifiable for his purposes; and in so far as various aspects of the environment have common practical consequences for everyone, the lay vocabulary might even be adopted for scientific use. But a complete scientific account must go back to properties of the environment which are effective before any consequences have been felt, and it must account for the process by which consequences alter the effectiveness of these properties.

Current practices are again diverse. Some psychologists, as in psychophysics, deal with stimuli one dimension at a time. Others, at the other extreme, refer to the "total situation"—an expression which seems

safe because it can scarcely overlook anything, but which is unpleasantly vague. Our present knowledge of the physiology of the receptors offers little if any help in deciding upon an effective practice.

Since we have not clearly identified the significant data of a science of behavior, we do not arrive well prepared at the second stage of theory building, at which we are to express relations among data. Observed relations of this sort are the facts of a science—or, when a sufficient degree of generality has been reached, its laws. The general form of the laws of behavior can be inferred from the nature of our program, but examples are not very abundant among the achievements to date. A weakness at the first stage of theory construction cannot be corrected at the second. In psychophysics the stimulus is defined rigorously, if not very comprehensively, and an arbitrary definition of response seems to suffice. Consequently, some generality at the second stage has been achieved. In the field of learning, on the other hand, we have collected thousands of separate learning curves, but they represent changes in hundreds of different aspects of behavior in hundreds of different situations. As a result, we have no valid general expressions for learning processes. This is characteristic of most of the facts of experimental psychology, and the next step in the construction of a satisfactory theory is therefore very difficult.

This step—at the third stage in theory building—can be exemplified by a simple example from the science of mechanics. Galileo, with the help of his predecessors, began by restricting himself to a limited set of data.

He proposed to deal with the positions of bodies at given times, rather than with their color or hardness or size. This decision, characteristic of the first stage in building a theory, was not so easy as it seems to us today. Galileo then proceeded to demonstrate a relation between position and time—the position of a ball on an inclined plane and the time which had elapsed since its release. Something else then emerged—namely, the concept of acceleration. Later, as other facts were added, other concepts appeared—mass, force, and so on. Third-stage concepts of this sort are something more than the second-stage laws from which they are derived. They are peculiarly the product of theory-making in the best sense, and they cannot be arrived at through any other process.

There are few, if any, clear-cut examples of comparable third-stage concepts in psychology, and the crystal ball grows cloudy. But the importance of the stage is indicated by the fact that terms like "wants," "faculties," "attitudes," "drives," "ideas," "interests," and "capacities" properly belong there. When it is possible to complete a theoretical analysis at this stage, concepts of this sort will be put in good scientific order. This will have the effect of establishing them in their own right. At present they need external support. Some of them, like wants and attitudes, come to us trailing clouds of psychic glory, and a wisp or two of the psychic can usually be detected when they are used. Other concepts, like drives and motives, borrow physiological support in certain favorable cases. Still others, like abilities and traits, have been made respectable

through correlational analyses, which give them the status of "individual differences." Although most psychologists think of an ability as something which has meaning in the behavior of a single individual, current techniques of measurement find it necessary to make use of the position of the individual in a population. Magnitudes are assigned to the abilities and traits of the individual in terms of his relation to the group rather than through direct measurement. A proper theory at this stage would characterize the behavior of an individual in such a way that measurement would be feasible if he were the only individual on earth. This would be done by determining the values of certain constants in equations describing his behavior—clearly a third-stage enterprise.

From all of this should emerge a new conception of the individual as the locus of a system of variables. Fortunately for psychology it has been possible to deal with behavior without a clear understanding of who or what is behaving, just as it seems to be possible to deal with personality without defining "person." The integrity or unity of the individual has been assumed, perhaps because the organism is a biological unit. But it is quite clear that more than one person, in the sense of an integrated and organized system of responses, exists within one skin. The individual proves to be no more undividable than the atom was uncuttable. Many sorts of metaphorical schemes have been devised to represent this fact. A single personality may be regarded as moving about from one level of consciousness to another, or personalities may be frankly multiple.

A proper theory must be able to represent the multiplicity of response systems. It must do something more: it must abolish the conception of the individual as a doer, as an originator of action. This is a difficult task. The simple fact is that psychologists have never made a thoroughgoing renunciation of the inner man. He is surreptitiously appealed to from time to time in all our thinking, especially when we are faced with a bit of behavior which is difficult to explain otherwise.

Eventually we may expect the main features of a behavioral theory to have physiological significance. As the science of physiology advances, it will presumably be possible to show what is happening in various structures within the organism during particular behavioral events, and the theoretical systems of the two sciences may also be seen to correspond. An example of this rapprochement is the way in which facts and principles of genetics arrived at from the study of the characteristics of parents and offspring are seen to correspond to facts and principles of cell structure. The science of genetics has already reached the stage at which it is profitable to investigate both subject matters at the same time. Terms which originally described relations between the characteristics of parents and offspring may now carry additional cytological references.

A similar day may come in psychology. That is up to the physiologist and the physiological psychologist. But the eventual correspondence should not be allowed to obscure the present need for a behavioral theory. The hypothetical physiological mechanisms which

inspire so much research in psychology are not accept-
able as substitutes for a behavorial theory. On the con-
trary, because they introduce many irrelevant matters,
they stand in the way of effective theory building.
There is a tendency in some quarters to admit this
while insisting upon compensating advantages. It is
argued that the solidity of the nervous system gives it
the strength to dispossess psychic fictions which a
purely behavioral theory may lack. It is also thought
to be a necessary intellectual crutch—an ever-present
help in time of theoretical need. Many people cannot
think of the origination of an act without thinking of
a motor center. They cannot conceive of learning with-
out thinking of changes in synaptic resistance or some
other protoplasmic change. They cannot contemplate
a derangement of behavior without thinking of dam-
aged tissue. Moreover, it is often pointed out that the
histories of other sciences show many examples of
theories which, under a proper operational analysis,
would have been found to contain unwarranted ref-
erences to other kinds of data but which made it
possible to think more effectively about relevant data
than would have been possible with a purely conceptual
scheme. But this remains to be proved. It is not neces-
sarily true that physiological theories have in the long
run directed the energies of psychologists into the most
profitable channels. An enlightened scientific method-
ology should enable us to improve upon the practices
exemplified by the history of science. In any event an in-
dependent theory of behavior is not only possible but
it is highly desirable, and such a theory is in no

sense opposed to physiological speculation or research.

Because of the unhappy fate of so many psychological theories of the past, a sound theory of behavior must work itself out against a weight of indifference and even active opposition. Very few psychologists understand the nature of such a theory or are aware that it has a counterpart in most established sciences. Many of them deny the possibility of a respectable theory. It is encouraging to recall, however, that a good tentative theory has usually proved to be autocatalytic; a demonstration of what can be done, even within a limited sphere, draws attention to theory-building, and the process is accelerated.

There is usually no need to justify a theory of behavior when its potentialities are made clear, for these are very great. Consider the case of the social sciences, for example.

The current practice of the sociologist is either to express his facts and theories without referring to individual behavior at all, or to construct a psychology of his own—devoting at least an introductory chapter (if not an entire treatise) to the motives and habits which lead men to live together and behave together as they do. The sociologist may or may not agree that the behavior of the group is to be predicted from a study of the psychology of the individual, but he has no hestitation in using the behavior of the individual to expound, if not to explain, sociological facts. The economist, whether professional or professorial, faces the same alternatives. Either he must state laws and make predictions without mentioning human be-

havior, or he must devise a special psychology to explain the activities of the great-grandchildren of Adam Smith's "economic man." It is the exceptional economist who does not account for facts about goods or money or labor or capital by pointing to what men will typically do under certain circumstances. Similarly, the political scientist, whether or not he hopes to derive the principles of government or the characteristics of political struggles from psychology, usually continues to talk about some species of "political man," to whom he assigns just the motives and capacities needed to account for his political facts.

Whatever his field, the social scientist does not currently find in the science of psychology a conceptual scheme with which he can talk about human behavior consistently and effectively. Economic man, political man, the group mind—these are crude explanatory fictions which need to be replaced by a sound behavioral theory. That such a theory need not be essential to a true social science is beside the point. There is no question that it would be enormously helpful.

There is a greater need for such a theory in those broad fields of human endeavor in which rigorous scientific practices are not yet feasible. For example, a widespread critical examination of our educational practices is currently in progress. This is basically a program of psychological engineering. Yet it is being projected and carried through with a quite unrealistic conception of human behavior. Ancient theories of the nature of man recur again and again, with their familiar cant—"an integrated view of life," "a sense of

personal responsibility," "a capacity to experience and understand life as a related whole," "the development of the mind," and so on. Educators are not wholly to blame, for we have not yet put forth a workable conception of human behavior suitable for their purposes.

Our legal system, to take another example, is based upon an even older form of the traditional theory. It is becoming more and more difficult to reconcile our modern conception of man and society with the legal notion of personal responsibility, of a will capable of conscious motion and dominated from time to time by ideas, feelings, and influences. But an alternative theory is apparently not yet in workable form.

The lack of an adequate understanding of human behavior is most cruelly felt in the field of government and world affairs. We are faced with the disheartening spectacle of hundreds of men of good will drawing up blueprints for the world of the future, while making assumptions about human nature that most of us know to be invalid. Two world wars have not been fought over anything as simple as world trade or boundaries. We are in transition from one conception of man to another and to an effective understanding of the possible relationships which may exist between men. We have paid a terrible price for knowledge which could conceivably be acquired through the peaceful and profitable methods of science and as yet we have little to show for it. A great deal may depend upon whether we can reach in the near future a workable theory of human behavior.

One important role of a scientific theory of behavior,

then, is to replace the theories which now pervade our thinking, which are part of our everyday speech, which influence all our dealings with our fellow men, and which stand in the way of applying the methods of science to human affairs. As everyone knows, many technical procedures which would improve our practices in education, law, politics, and so on are now available. The contribution which the science of psychology can make in these matters is very great. Psychologists have been powerful advocates of an objective attitude and will undoubtedly continue to insist that the methods of science be applied to human behavior and human society wherever possible. If we are to talk about behavior, let us be precise. If we are to insist that two facts are related, let us prove the relation. Psychology can offer better ways of describing and measuring behavior, better methods of guaranteeing the validity of statements, and so on. But nothing of this sort is any longer exclusively a psychological contribution. The main task is to make these technical contributions felt, to put them into the hands of the people who need them; and we can do this only when we make it clear that a science is more than method, more than facts. The most important contribution that psychology can make today is a workable theory of behavior in the present sense—a conception of man which is in accord with all the facts of human behavior and which has been crucially tested in the experimental laboratory. Only an effective and progressive theory of behavior can bring about the proper change in attitude which will make it possible to apply

the methods of science to human affairs in every field.

The survival of the traditional conception of man as a free and responsible agent is an excellent example of the general principle* that a theory is never overthrown by facts, but only by another theory. There are facts which have been well established for centuries which are incompatible with the traditional theories of human behavior, and these theories move about in the modern world in a welter of contradiction. But their proponents work busily to patch them up, and somehow they survive. A new interpretation here, a conspiracy of silence there, and the trick is turned; and this will continue to be so until a new and effective theory is worked out.

We cannot remedy the situation by mere dialectic. We need to arrive at a theory of human behavior which is not only plausible, not only sufficiently convincing to be "sold" to the public at large, but a theory which has proved its worth in scientific productivity. It must enable us, not only to talk about the problems of the world, but to do something about them, to achieve the sort of control which it is the business of a science of behavior to investigate. The superiority of such a theory will then be clear and we shall not need to worry about its acceptance.

The important trend in experimental psychology, then, is toward a satisfactory theory of behavior. Perhaps we should not be surprised at this, since the field was defined in such a way that it would necessarily be

* Recently pointed out by President Conant of Harvard University in the *American Scientist*, January 1947.

true. But the field had to be defined in that way. Experimental psychology is more than a tradition; it is more than an assemblage of practices and interests passed along from generation to generation without respect to a changing world. A tradition needs to be reviewed and justified, and this is especially true in experimental psychology, where it has been easy to lose the main theme. The trend, then, is toward a clarification of this theme, toward a sort of self-realization. The experimental psychologist is not using method for method's sake. He is not following an interest to which he has been led by indulging in one idle curiosity after another. He does not seize upon a field of research because the practical-minded have left it untouched. In so far as he is behaving as an experimental psychologist, he is trying to understand behavior. In this work he must discover and collect facts, and he must construct an adequate theory.

A clear realization of this aim should be helpful. There is nothing wrong with experimental psychology that a clear-cut objective will not cure. The development of an effective theory of behavior is ideal for this purpose. The science of experimental psychology will presumably remain in the hands of the professors. Critical issues in applied fields may lead to important contributions to theory; methods will be devised and facts discovered in industry, education, the clinic, and so on, which are relevant to a central science. But the husbanding of facts, the sifting of information from all fields of human behavior, the special study of questions which are theoretically crucial, and the working

out of a satisfactory conceptual system will presumably remain the function of the psychologists in our universities. This is still so, at least, in older sciences with much more extensive technological applications. It is appropriate, too, that a concern for theory in this sense should remain closely associated with instruction.

But the academic psychologist is limited in the time and facilities available for research, and at the moment he may be rather bewildered by, if not envious of, the glittering technical advantages of his erstwhile colleagues. In theory-construction, however, he finds a field which is not only exclusively his own, but one in which he can experiment effectively and to some purpose with relatively limited resources. He will not need to confine himself to facts which have been neglected by those who can experiment more efficiently. He will be able to explore key positions of the greatest importance. The *experimentum crucis* is his field, and in it he may usually rest content with one subject for every hundred studied by his applied colleagues and with one chronoscope or pursuitmeter or cathode-ray oscillograph in place of dozens.

This is not a gesture of escape. It is not a conclusion that the grapes are sour. The experimental psychologist is above all a scientist, and this is the proper field of science—the discovery and ordering and understanding of nature. This is Faraday and Maxwell rather than the laboratories of General Electric or Westinghouse. It is Mendel and T. H. Morgan rather than an agricultural breeding station. It is Pasteur and Koch rather than research laboratories of great pharmaceutical

houses. This is good company. To understand human behavior in the sense in which any part of nature is understood by science is truly an exciting and a satisfying goal.

CHILD PSYCHOLOGY

Robert R. Sears

CHILD psychology began as an applied science. In the early years of this century professional educators were just beginning to recognize, officially, the significance of motivation and the laws of learning as essential elements in the educative process. Their immediate concern was to discover devices by which children could be made to learn more quickly and efficiently. Today, their professional successors can hardly imagine such a simple aim, for child psychology has so changed our understanding of the child that the educational procedures of only twenty-five years ago are now considered part of the *history* of education.

It is impossible to divide any science into sharply defined historical periods, of course; there are always precursors of the next step, and always a few johnny-come-latelies. Without trying to put too fine a point on the exact date, we can recognize that child psychology grew out of its anecdotal period about 1920 and quickly took on the stature of a major science. Following the first World War there was widespread acceptance of child development as the key science for remedying many of our social and educational ills. Research institutes were founded, staffs were recruited, and during the ensuing two decades vast quantities of research data were published.

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As judged by the standards of the scientific disciplines from which the researchers were drawn, the methodological merit of that work was high. Indeed, in anthropometry, studies of child growth became so much more technically rigorous than earlier studies in physical anthropology or gross anatomy that the field of child growth now provides the standards, in method, by which work in the parent fields is judged. In child psychology there was an equal prepossession with method. This is not surprising, for psychologists have always been the most sensitive of all scientists to problems of methodology.

This concern for method was reflected not only in the narrower sense of experimental design and instrumental accuracy, but also in the way of approaching the subject matter to be studied. In 1920 psychology was in the final throes of becoming a behavioral science, and psychologists were meticulously charting the behavior potentialities of cats, rats, dogs, and men. This was the topographic stage of behavior science, the period of finding accurate ways of describing behavior, defining significant variables, discovering, in other words, what man and the other animals did. Psychological functions were isolated, environmental antecedents of certain common forms of action were listed, and the limits of various capacities or abilities were determined.

The child was a natural subject for such study as this. He was human but his psychological properties were largely unknown. As conventionally trained psychologists turned their attention to him, he began

to yield his secrets. His intellectual abilities, sensory capacities, and emotional potentialities were explored. His motor development, play interests, and methods of reasoning were described. The descriptive problems were endless, for with respect to each of the variables examined, there were essential ramifications into age and sex differences, and these variables introduced the normative problem as well as the topographic. By the mid-thirties a psychological description of the human child made one think of a phrenological chart. He was segmentalized and compartmentalized until the child that *embodied* the description was scarcely discernible behind the fog of normative facts.

And *facts* there indubitably were. But somehow they did not add up to a living, adapting, educable, turbulent child. From educators came a plea for general principles that would make the facts cohere, that would permit of theoretical rather than actuarial prediction of behavior. In the absence of such principles, there developed a point of view called the organismic. To call it a *theory* would be to imply that it had some effective relationship to research. It did not. It was essentially a spiritual revolt against the vast quantities of normative data, data which the organismic psychologists wrongly interpreted as being the research psychologists' substitute for scientific principles. Normative data are obviously not the be-all and end-all of science, but they are a necessary first step. Child psychology had taken this first step with such enthusiasm and self-acclaim that some were misled into believing there might be no further progression.

Nonetheless, the concept of "the whole child," futile though it may have been as a direct stimulus to research, was not without influence. Or perhaps it was symptomatic. In any case, the once bold advance toward normative and piecemeal analysis has slowed. Like a fine, confident storm cloud dashed headlong against a mountain peak, research in child psychology has gone awry, become hesitant, unsure in direction, and momentarily without speed or force. Beneath the confusion, however, there is a systematic direction of movement, a direction partly induced, partly only anticipated, by those who pled in one guise or another for a more meaningful, a more practical, a more dynamic psychological science of childhood.

Evidences of this undercurrent can be seen in the popularity of certain research problems during the past half dozen years. Two areas stand out—adolescence and personality measurement. These are in no sense commensurate rubrics; adolescence is, roughly speaking, an age period, and personality is an aspect of behavior. But there is a significant fact to be related about both —they specify research areas in which the problems are largely defined with respect to *molar* rather than *segmental* behavior. This is quite evidently true of personality, and a brief examination of recent literature on adolescence shows it to be true there also. Adolescence is a time of unusually severe strain both for the child himself and for the social environment that must absorb him. Research interest derives mainly from that fact, and recent investigations are preponderantly oriented not toward normative matters but toward the

social and emotional processes involved in adolescent adjustment.

Child psychology's anecdotal period is far in the past. The methods of its topographic and normative period have reached the point of diminishing returns, and it is turning now to new problems and new methods. So, what kind of a psychological science is child psychology becoming?

First, it is systematic, that is, it attempts to derive general principles, or laws, about the relationships between variables that have been so defined as to be mutually exclusive within a self-consistent theoretical framework. The significant terms here are "mutually exclusive" and "self-consistent." In defining a variable such as *drive strength,* the psychologist commonly seeks for an operation that is easily denotable, and that is completely separable from all other operations that may be used in an experiment. In some cases this has proved simple; for example, the strength of the hunger drive in a rat is defined by reference to "number of hours of food deprivation." Nothing else about the rat or his behavior, as research measures are recorded, is allowed to include a reference to this operation. It is exclusive. The highly elaborated secondary drives of children give greater difficulty, of course; a good operational definition of the strength of competitive drives in nine-year-old boys has not yet been selected, although it does not seem utterly improbable that some defense-reducing technique coupled with standardized interview procedures might provide a sufficiently replicable operation even for this presently difficult concept.

Not all variables are definable by measurement oper-
ations, however; some belong to the class of interven-
ing variables that must be defined in terms of logical
operations. For example, the *effective strength* of insti-
gation to aggression must be derived, by combination,
from independent (mutually exclusive) measures of
excitation and inhibition and must have a mathe-
matical definition unless the whole theoretical system
relating instigation to action is to become circular and
depend on sheer measurement of action probabilities
alone without independent measure of instigation. It
should be clear, therefore, that the mutually exclusive
character of defined variables refers only to the initial
measurement operations, and not to the logical opera-
tions required for defining intervening variables.

Operationism alone, however, does not adequately
describe the current systematic approach of child
psychology. The self-consistency factor is equally signifi-
cant. No body of scientific knowledge can go much
beyond the topographic stage until its variables are
limited to those which can (a) enter effectively into
equations with one another, and (b) produce predic-
tions based on antecedent-consequent relationships.
Both requirements involve self-consistency, but they
may be considered separately.

For the first point, let us take as an example the
effects òf foster home placement on Stanford-Binet test
performance. Obviously we must discover that there
is an effect before we have a problem, but once the
effect is discovered the problem must be phrased quite
differently if we are to derive general principles from

this relationship, that is, principles which will enable us to predict *other* kinds of performance than that on the Stanford-Binet from *other* kinds of experience than foster home placement. These two empirical variables must be translated into systematic psychological terms of such a character that they may be identified wherever the specified conditions occur. This is not simply a matter of armchair logic; it demands arduous and careful research. But unless we find out what psychological variables constitute "foster home placement," we will never know any more about children's potentialities for change than that a foster home has such and such an effect. This is clearly an uneconomical fact to find out. Research of that sort is expensive and exhausting. Worse, it must be repeated endlessly, for there are dozens of significant social situations that may influence a child's life—going or not going to nursery school, having or not having his father in the home, living in a rural or an urban area, and so on. It is the realization of the relative uselessness of piling up so many discrete and uncombinable relational statements that is turning child psychologists toward analysis of each empirical variable into its component psychological variables. These latter can then enter into equations with one another and permit generalizations far beyond the confining conditions of any given experiment.

The trend toward systematization involving antecedent-consequent relations is less clear. Perhaps this is more a case of what *ought* to be done than what *is* being done. Recent studies of child personality have been heavily influenced by the diagnostic needs of

clinical psychology. In that profession there is serious need for techniques or instruments that will enable the clinician to measure the child's propensities for certain kinds of action. Current enthusiasms for the projective techniques are a case in point. It must be recognized, however, that research on such diagnostic instruments is oriented toward what Spence[14] has called response-response relationships. A child behaves in a certain way with finger paints and in another way with his playmates. Whatever equation is written about this behavior contains only two terms, both of which are responses. This is little more than actuarial science; if the child acts one way in one situation, he acts in a corresponding way in another.

True theoretical prediction can come only with a set of principles that specify a necessary relationship between an antecedent event and consequent behavior. Except for the diversionary intrusions into personality diagnostics child psychology is happily dominated by this type of thinking; indeed, it has been inherent in most American psychological research from the turn of the century. The problem is worth mentioning here only because some of our more ardent projectionists seem occasionally to confuse their instrumental engineering with the toughly rigorous process of developing a theoretical science.

So much for the systematic aspects of current child psychology. These attributes are a little detached from the actual content of the science, however, and from what has been said so far, it would be difficult to guess what kinds of facts comprise the field of child psy-

chology. It is systematic; it seeks general principles that relate operationally defined and mutually exclusive variables in an antecedent-consequent way within a self-consistent theoretical framework. Whether this is a useful scientific progression beyond the norms and topography of an earlier day depends entirely on what kinds of variables constitute the science.

The subject matter of child psychology is trending toward what may be called molar behavior, that is, behavior of the child as a whole, an adapting, manipulating, motivated unit moving in an environment having stimulational and manipulable properties. Study of molar behavior involves three emphases well worth noting. One is motivation. Instead of simply cataloguing children's abilities in respect to isolated functions, such as depth perception, contemporary investigators are extending their interest to the nature and origin of the motivational factors that lead the child to perform acts of perception. In some cases motivation enters directly in its own right, as in studies of the effects of frustration; in others, it is an included element in the learning process, as in studies of the development of stuttering or other forms of speech pathology.

A second emphasis is on the learning process itself. Earlier normative studies of childhood were oriented toward listing the limits of ability at different ages. Development was all too often dealt with descriptively; a mathematical curve based on measures of a function at successive ages was substituted for a psychological explanation of how the child got from one stage of ability to another. For example, it is possible to meas-

ure motor skills or vocabulary content at ages 3 to 8. Annual increments can be charted with precision. But to have a truly developmental science there must be a set of explanatory principles to indicate the processes by which the child's ability makes the charted changes. Until these principles are discovered there is no possibility of predicting which children in a group will follow the norms, nor of explaining why one child does and another does not, nor of controlling or modifying the development in any way whatsoever. Indeed, unless the principles of learning enter in detail into the *planning* of an investigation, it is doubtful that the resulting data will contribute much of value to the psychology of childhood.

The third emphasis is on the social setting of behavior. As early as 1928, Margaret Mead, a psychologically trained anthropologist, began to introduce data from alien cultures into child psychology.[7] The significance of her findings was not at once apparent to those who were still concerned with normative studies of individual development, but within the decade there was a full flood of realization that children of other cultures developed differently from those of our own. Dennis's *The Hopi Child*[8] marked the happy point at which the formal discipline of child psychology itself introduced cross-cultural methods into its research repertory.

The social setting as it is represented in contemporary trends is far more fundamental, however, than the use of other cultures as experimental controls on our own. It is the instigator and manipulandum of

behavior, the matrix within which all action must be described and to which all explanatory principles must ultimately refer. It is the maze that determines the limits of, and provides part of the stimulus to, individual action. Ultimately, I venture to predict, it will become the subject of a body of scientific principles for which individuals and their behavior will be the specified antecedents, while social action and its modification become the consequents. When that time comes, child psychology will be but a segment of a larger science, the social science of childhood. In the meantime, research is being increasingly oriented toward problems that permit a statement of the findings in terms of the social stimulus conditions of behavior. Studies of parent-child relationships, social class and caste, interpersonal control, and sex typing exhibit this tendency most clearly.

It should not be supposed that all current researches follow in all details the pattern that is being outlined here. Indeed, few recent papers exhibit all these characteristics. But if one abstracts the most promising trends from the most stimulating research programs, the emerging new science of child psychology differs from the old topographic and normative science in that it is a systematic approach to the molar behavior of the developing child, with emphasis on the conception of the child as a motivated, adaptive, manipulating organism living socially and changing constantly by virtue of his capacity to learn.

So far only one reasonably well-formulated system that embodies these various attributes has developed.

This is the set of assumptions, definitions, principles, and empirical findings that comprise reaction psychology. This system is rooted in the learning theory of Hull,[5] but its ramifications into social learning,[8] secondary motivation,[10] frustration,[8] anxiety,[9] and personality development[18] go well beyond the closely charted region of rigorous stimulus-response theory. Fundamental definitions relate to various aspects of the behavior sequence, and the relational principles are organized about the twin problems of ongoing action and behavior modification. The full details of the principles and relevant research have not yet been brought together in a single book, but the following quotation gives a brief perspective.[12 (p. 215)] "The basic unit of molar behavior is an action sequence that terminates in a *goal response,* that is, a consummatory action that reduces the strength of motivation to perform that specific action. Such responses are reinforcing, or rewarding. The antecedent conditions, both internal and external to the organism, are defined as *instigators* of the behavior sequence. When instigation occurs, the organism must often perform a series of *instrumental* acts before the goal response itself can be made; that is, it must do things that put it in such appropriate context with the environment that the terminating action can be carried out. For example, a child who is hungry, as indicated by the fact that he has not eaten for several hours, sees bread and jam on a shelf. He climbs on a chair, puts the food on the sink, makes a sandwich, and finally eats it. The hunger is the drive-instigator; the sight of food is a cue stimulus or instigator; the prep-

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arations for eating are instrumental acts; and the actual eating is the goal response. It will be noted that the eating puts an end to the child's actions relating to food. . . . From a systematic standpoint, a behavior sequence may be analyzed in terms of either learning or on-going action. An analysis of its learning characteristics would include such considerations as the amount of reinforcement provided by successful completion of the act, the nature of the discriminations differentially reinforced, the kinds of anticipatory responses established, and the changes in relative habit strengths of the different potential responses to the stimulus conditions present at the time the act started and ended. Clearly, it is of great importance whether the act terminated in a goal response or was met by non-reward or punishment, since the type of terminal act determines whether reinforcement or extinction of antecedent acts occur. This kind of analysis provides the necessary information about the person's *post-act response potentialities* that must be known to permit prediction of his future behavior.

"An equally important systematic problem is that of the antecedent-consequent relations within the action system itself. If a person's response potentialities are known, it becomes necessary to specify what stimulus conditions will produce what responses. Again the fate of the behavior sequence becomes important, for if it terminates in a goal response there will be a lessened tendency to perform the same actions immediately afterward. But if there is interference, any one of a host of consequences may ensue, depending, of

course, on the nature of the action and the stimulus conditions obtaining."

Any systematic approach determines and is partly determined by three other matters of concurrent interest to the scientist—research methods, research areas or problems, and fields of application. To some degree each of these develops independently of the general theoretical formulations of the science. As much as we give lip service to the principle that our problems determine our methods, the all too human facts in the case are that we often do what our methods permit. Scientists are by no means as logical in their actual production of science as the analytical logicians of science would have us believe. It is not uncommon for a research method to develop and become widely used simply because it is workable, economical, reliable and, in some not too clearly defined way, seems to be getting at something important. Likewise, there are areas of investigation, such as adolescent adjustment, that attract the researcher because he views with alarm the lack of a systematic body of knowledge that might permit control or therapy. Again, a need for data that will enable such an applied field as parent education to function effectively may determine the direction of research. In any case, available methods, important problems, and areas of application are a part of any science, so we must consider what is ahead for child psychology in these respects.

One salient fact about method stands out, both in regard to systematization and in regard to research problems. This is the fact of methodological orienta-

tion toward molar behavior. If the child is to be studied in terms of his adaptation to and manipulation of his social world, and if the effects of this interaction on his behavior potentialities are to be analyzed, it is essential that observational techniques be designed for the measurement of those motions relevant to such a conceptualization. Two general methods show promise; one is *observational sampling of behavior* and the other is the group of procedures called *projective techniques.*

Observational sampling has great versatility because its central core of apparatus—man—can be adapted to the measurement of so many things. "The meaning of this can best be made clear by an analogy and an example. If one wishes to make an exact study of the respiratory pattern of a living organism, he has only to attach a pneumograph to the chest and upper abdomen; this device is a rubber-covered coil spring that expands and contracts as the chest changes volume. Corresponding changes in the volume of the pneumograph can be transmitted to another extensible cylinder, and this in turn can make a stylus squiggle on a smoked drum driven by a clockwork motor. The actual connection between the drum and the organism is through the pneumograph and it is this instrument which faithfully records the movements of the chest wall."[11]

But in a science of molar behavior we are likely to be little interested in the physical movements of chest walls. Our problems often require that we measure action patterns defined in terms of their social relevance or their sources of instigation. For this, only man is or

probably ever will be adequate, since these interpretations involve the instantaneous evaluation and weighting of more variables than any other machine can encompass. Take, for example, the measurement of aggression in a four-year-old boy. There is no single movement or group of movements which can be labeled as aggressive. Whether an act belongs in that category depends on the boy's own perception of other person's motives and anticipations, and on his intent in acting as he does toward them. The nature of his movements may vary from jerking another child's toy away to sheer nonco-operation as exemplified by an apparent failure to hear a question. Between these extremes there are literally hundreds of possible actions varying not only in degree of overtness but in the kind of motive frustrated in the recipient, the use of language, the degree of admission that the act is aggressive, and in many other ways. The acts themselves may include such diverse things as talking to someone else, swearing, building a house of blocks, or even smiling.

Whether any one of these is aggression depends on too many factors for easy enumeration, but the diversity of the acts makes clear something else. Not only is a mechanical instrument useless, but it is useless for the very same reason that it is useful in recording segmental behavior such as breathing. The pneumograph records certain specifiable motions without reference to why or under what conditions they occur. The experimental subject may be asleep or awake, frightened or calm, interested or bored; even worse— he may not make breathing movements at all for an

instant, but simply move his arm or so change his posture that the mechanical, insightless, noninterpreting pneumograph faithfully indicates just what motions the chest wall makes. But the student of molar behavior cares little about that; he is interested in actions that are described by reference to their motivational, manipulative, or consummatory properties. This only man can do, and hence it is likely that observational sampling will, in one form or another,[11] continue to be a technique of major importance to child psychology.

The projective techniques, particularly those like doll play and finger painting that require the child to manipulate something, have a somewhat different purpose. Not only do we need methods by which a child's ongoing action can be recorded and measured, but we must have devices by which his potentialities for action can be discovered. Behavior at any given instant is a product not only of immediate external instigators, but also of the drives and habit structures that have been created by past actions. The exact status of these internal antecedents must be determinable if there is to be accurate prediction of action. This is the response-response equation mentioned earlier.

Further, there are many behavior consequents of a child's experience that cannot be measured directly. For example, a not uncommon experience to which young children are subjected is the withdrawal of the father from the home. This is the antecedent condition, highly complicated from a psychological standpoint, to a number of behavior consequents. Some of these

are exhibited only on the rare and sporadic occasions when by chance the environment offers the necessary conditions for their occurrence. Such an event as the return of the father to the home might be reasonably difficult to engineer if one were seeking data on the nature of the child's emotional reaction to the father himself. Other consequents may relate to kinds of behavior that are difficult to measure in real life, or that carry a threat to the child's mental health. In one recent study, for instance, it proved possible to compare the amount of self-aggression in boys whose fathers were and were not, respectively, living at home.[13] Although the boys with fathers at home were significantly more self-aggressive, as measured by their doll play performance, it is unlikely that adequate data on the problem could ever have been secured had we been forced to rely on overt behavior samples. Overt self-aggression, the only kind that can be recognized accurately, is rare and difficult of interpretation.

Since projective techniques have been developed in large part by clinical psychologists, it is not surprising that the kinds of variables for which they are commonly used as measuring instruments are the kinds toward which child psychology in general is turning. Undoubtedly the method itself will be explored intensively during the next few years, and perhaps methodological enthusiasms will send some investigators into blind alleys. But this is an inescapable cost of the transition from topographic to systematic science—and one that child psychology will be only too happy to pay if more fruitful methods result.

Consider now the problems that are most pertinent to these methods and to a reaction-oriented child psychology. The current trend toward personality and adolescence, with emphasis on adjustment, has already been mentioned. These form part of a general area that can be more clearly delineated by a quick review of the relation between the terms *personality, motivation, and social behavior.* "The child is endowed, at birth, with a potentiality for securing many forms of gratification from his world. He can eat, he can eliminate when need be, he can be warmed or cooled, he can be fondled and loved. These experiences are not only gratifying; they are also the sources of learning. The infant not only learns to speak and walk and do his sums; he learns as well to love his mother, to trust older people, to act like a boy or girl, to dislike bullies, to share his toys, and perhaps most important of all, to want many things that he had only a *potentiality for learning to want* at birth. He wants affection, perhaps much, perhaps little; he wants to be alone or with others; he wants to attack some people and defend others; he wants to make a stamp collection or he doesn't. It is these wants that comprise the aspect of behavior called *motivation.* Obviously a child who *wants* to overcome difficulties by himself, without adult aid, will soon come to be called *independent* by his parents. This is a word referring to a personality trait. And obviously, too, he will try to control other people in such a way that he can satisfy his want. Hence this motivation determines his social behavior."[11]

The three terms, personality, motivation, and social

behavior, need be defined no more exactly, for they are simply textbook chapter headings—rough indicators of great groups of interrelated research problems. In connection with motivation, the most crucial problems are those that deal with the development of secondary drives. Although the paradigm for this process has long been familiar to students of animal behavior,[17] the application to children has been on an entirely analogical basis; there is no published research that traces the conditions of formation of any secondary drive in a human child. Yet the bulk of human behavior is motivated by highly elaborate drives that have become so detached from the original primary drives from which they were derived, and have become so intimately intertwined with language habits, that simple analogical reasoning leaves us in a state of ignorance almost catastrophic. Aggression and anxiety, self-esteem and sympathy are among the most pervasive secondary drives, but we are familiar with them only in their developed state; we are just beginning to seek their origins. Another set of important questions relates to sex development in early childhood. Psychoanalytic theory has been influential in turning the child psychologists' attention to the drives for organic satisfactions in infancy and early childhood. How are these interrelated, how may they be modified, what kinds of behavior do they initiate? These are the kinds of questions that are now being asked about motivation in childhood. The same ones can be asked about personality traits and about emotional action systems.

As soon as one examines the developing individual

from a systematic point of view, however, he is struck by the extreme importance of social interaction. Other people serve as stimuli and as tools for the growing child. The parents, in particular, influence his behavior not only at a given moment, but by establishing drives and habit structures that may survive in one form or another for a lifetime. What are the mechanics by which, for example, a child learns communicative language habits from his parents? What aspects of the communicative input to the child must we measure in order to predict his output? Or another problem: how do children learn to control their parents and playmates? To what extent can their techniques of social control be modified? What techniques are most easily modified, and why? If present trends in the study of the social psychology of childhood continue, questions like these will be appearing in doctoral examinations a decade from now, and will require answers couched in terms of accomplished research.

It would be possible to multiply almost indefinitely the research problems that involve the individual and his immediate interaction with others. But there is more in the offing than pure child psychology. To the extent that we are turning in the channels I have so far described, we must be prepared to undertake cooperative research with the sociologists and anthropologists. Mention has already been made of the trend started by Margaret Mead nearly two decades ago. Among the anthropologists this interest has not died. Recent investigations by Hallowell,[4] Kluckholn,[6]

Warner,[15] Davis and Dollard[1], Whiting[16] and several
others have been pointing toward a vigorous attack
on the question of how the cultural milieu influences
the child's learning. In the community structure there
are a host of forces, intangible to the individual psy-
chologist, that can best be described by the systematic
language of the sciences of groups and cultures. To
understand the pace at which a child develops in any
respect, and to have principles that will relate social
stimulus events to the child's own habit structures, we
must know what these forces are and the mechanisms
by which they are made to impinge on the individual
parent and child. Research of this kind is primarily
anthropological and sociological, but its relevance to
current trends in child psychology is so great, and the
working relationships of investigators from the dif-
erent disciplines are becoming so intimate, it is not
inaccurate to say that the first steps have already been
taken toward the construction of a social science of
childhood, a science that far transcends in importance
any of its component fields.

Finally, some consideration must be given to the
ways in which child psychology is being applied to
problems of human welfare. There have been times in
the past when psychologists of other specialties have
had but little interest in such matters; this is no longer
true, and it never has been true of child psychologists.
From the first, educational needs dictated some of the
major directions of research, and even during the in-
tense laboratory period between the two World Wars
parent education and guidance were matters of great

concern. To an important degree, these and other applied fields are adding pressure for the kinds of changes now occurring in the methods and content of child psychology. Parent education, for example, deals extensively with parent-child relations, and with the social aspects of child rearing. Through two decades it had to rely on information gathered more often through clinical methods than experimental. It is scarcely surprising that the continuous plea for more accurately defined principles should eventually turn the researchers in those directions. It is not surprising, either, that such research is more likely to be designed with molar behavior than segmental behavior as its subject. Parents must always live with and train real live children, and social learning and motivation are the variables over which they have the most control and which can create, in the family, the greatest satisfactions or consternation.

Another applied field that is influencing research is clinical psychology itself. Dissatisfied with the ambiguity of their own conclusions about children's behavior, the clinicians are turning more and more to research in the field of child development. The systematic approach will eventually permit the formulation of a sophisticated theory of psychotherapy based explicitly on the learning process. This is not to say that learning is the only psychological process to be considered in psychotherapy, but simply that it is an important one. No theory of therapy will ever reach its full efficiency or permit of accurate prognosis until the principles of learning are incorporated in it.

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As we look at the many areas to which the child psychologist must contribute his specialized knowledge, we recognize in all of them the fundamental problem of dealing not with static, disembodied functions, but with a living, adapting, manipulating, changing child. In psychotherapy, in clinical diagnosis, in preschool education, in parent or preparent education, in social welfare work for children, there is first and foremost a *whole child* to whom we must be professional servants. Research can never be successfully directed at the *whole* itself, but it can be oriented toward those variables that combine to make the individual the molar unit of society.

In sum, then, child psychology is in process of taking the next step beyond topography and norms. It is becoming systematic. To the older methods of standardized tests and instrumental recordings, it is adding observational sampling and projective techniques in order that more emphasis may be given to the discovery of general principles about variables that relate to molar behavior in its social setting. It is, in other words, still responsive to the needs of those whose urgings gave it birth—the professional practitioners of human welfare.

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CLINICAL PSYCHOLOGY

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CLINICAL psychology, unlike experimental or child, is not a subdivision or a field of general psychology; rather, it is a variety of applied psychology and as such, more closely related to personnel psychology and human engineering and psychotherapy.

Like other types of applied psychology, clinical psychology draws upon and utilizes the facts, principles, and techniques of all fields of psychology. It is distinguished from other types of applied psychology by a single characteristic—the nature and the object of the application. As a scientist, the psychologist is interested in determining general principles and laws as they relate to human beings; as an applied psychologist he seeks to utilize these general laws and principles in the solution of the practical problems of human beings. An applied psychologist who specializes in applying psychological facts, principles, and techniques to the problems of the individual is a clinical psychologist.

The term *clinical* is borrowed from its medical usage. Originally, it meant "of or pertaining to a bed," but even in current medical practice its usage is no longer limited to the individual whose problem is of such a nature as to require the clinician to visit him at his bed. Today, *clinical* applied to any specialty means only that the person is being studied and re-

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garded as an individual, not as a member of a larger group. In a very real sense, then, it may be said that clinical psychology is applied psychology of the individual.

The application of psychology to the individual, however, is in no sense restricted to clinical psychologists. The psychiatrist utilizes psychology along with other basic sciences. Likewise, the educational or vocational guidance counselor and the special teacher are all, in one sense, applied psychologists working with the problems of individuals. And with improved training programs for other professional and supervisory groups, for example, the general medical practitioner, the personnel supervisor, the minister, and the foreman, we may expect to see even wider application of psychology to individuals by persons who do not call themselves clinical psychologists. This being so, it seems proper to ask: "What is a clinical psychologist?"

This question is not one to which there is a ready and adequate answer. Of course, we can reply glibly, "The clinical psychologist is a psychologist engaged in the application of psychology to the problems of individuals." But this is not a really satisfactory answer. Except for the word psychologist, the definition might apply equally well to members of several other professional groups. The reason for our difficulty in supplying a more adequate answer can be understood only in the light of a brief historical review.

As we all know, psychology is one of the youngest sciences to have been given academic recognition. It is therefore not surprising that academic psychologists were more interested in maintaining and increasing

the scientific status of the discipline than in furthering its applications. The actual birth of applied fields occurred when the parent science was still very young, and as is so often true when the parent is immature, these offspring tended to be rejected and left to develop pretty much on their own. Thus, in spite of Muensterberg's early contributions to industrial psychology, it is only relatively recently and in but few academic departments that students can secure well-rounded training in the professional applications of psychology to industrial problems.

Similarly, in spite of Witmer having established the first psychological clinic at the University of Pennsylvania over fifty years ago, academic departments, with a few exceptions, were very loathe to undertake professional training in the applications of psychology to problems of the individual. To be sure, many departments of psychology offered a few scattered technique courses such as mental testing or vocational guidance, which interested students might elect in order to acquire certain practical skills, but little attempt was made to develop a full and balanced program of professional training. Under the circumstances, it is not surprising that courses in the applied psychology of the individual began to be offered in professional schools of the universities (for example, in medical schools, departments of education, schools of social work, and business schools) and often without the word psychology appearing in the course titles.

A contributing reason for this general state of affairs was the almost complete absence of any definite state-

ment of the duties and responsibilities of a clinical psychologist. The total number of professionally employed persons who called themselves clinical psychologists was relatively small; the group was extremely heterogeneous with respect to amount and type of training and experience, and no definite professional standards existed. The more able and professionally inclined members of the group made sporadic attempts to increase standards and to improve training in clinical psychology, but as late as 1940, the picture was not a promising one. In most states the clinical psychologist of that date might be anyone with a bachelor's degree and a few courses in psychology who was willing to work primarily as a technician and grind out IQ's day after day for a salary of maintenance plus a few hundred dollars per year. Of course there were exceptions: a few able clinical psychologists by virtue of a combination of superior ability, unique training, extensive experience, and personal qualities had by this time achieved for themselves positions of responsibility and were permitted to engage in professional duties other than mental testing. In many instances, these exceptional clinicians did not hold the Ph.D. degree, not because of any lack of ability but because they had found academic departments unwilling to offer graduate clinical courses and unwilling to accept clinical research as an appropriate type of doctoral dissertation.

We should note however that these superior clinical psychologists of a few years ago achieved their status as individuals and not as members of the profession of clinical psychology. Rightly or wrongly, a profes-

sional group tends to be judged not by its best but by its weakest representatives. Clinical psychology, with its low academic standards and its low salaries, which could hardly have attracted the best graduates, was not in an enviable professional position in 1940.

Worse still, during the earlier period there was almost a complete hiatus between clinical and academic psychology. Practical clinicians bemoaned the sterility and lifelessness of academic courses in our universities and their professors were shocked at the lack of scientific rigor which characterized many of the publications of their former students who had turned clinicians. Neither was good for psychology or its clinical applications; yet the situation continued. It was a rare professor of psychology who had sufficient interest in clinical application to maintain personal contact with real cases— and it was a most unusual clinician who completed a thorough and rigorous training program in psychology either before or after beginning clinical work.

This was but a very few years ago. Today the situation is almost unrecognizably different. A few weeks ago there appeared a Civil Service announcement calling for qualified clinical psychologists at a pay scale ranging from $4,149 to $7,102 per year, and legislation is pending to increase greatly the top salary of clinical psychologists in government service. All but the lowest of these positions call for a doctoral degree in psychology and all call for a period of supervised internship training. Reading on, one discovers that "finding IQ's" constitutes but a very small item in an imposing list of professional duties which specifically includes diag-

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nosis and treatment of maladjusted individuals and research on neuropsychiatric problems. And—although the announcement did not say so—it is generally known that there are not just one or two such positions open— there are literally hundreds—and this in spite of the fact that Civil Service has already lured a large number of qualified persons away from state institutions and local agencies which had not yet begun to offer clinical psychologists comparable salaries or professional opportunities.

Another item: There are at this moment several hundred graduate students in psychology in some thirty different academic departments pursuing the Ph.D. and at the same time specializing in clinical psychology. And if present indications are correct, by next year this number of students will have doubled. Practically every university qualified to offer the Ph.D. degree in psychology will be represented. And finally, we may note that clinical psychology has been given a full sized chair in this round table on Current Trends in Psychology arranged by the academic department of psychology at this eminently respectable institution of higher learning!

Truly a professional revolution has occurred—or more correctly—*is* occurring in clinical psychology. To return to our earlier analogy—the formerly rejected child is growing up and, though it is still too early to complete the case history of the formerly rejected child, we can, I believe, profitably review the history of more recent events and consider some of the more pressing problems still confronting the profession.

CLINICAL PSYCHOLOGY

Like so many other recent developments, these cataclysmic changes in clinical psychology may be traced directly to World War II. Personnel psychology won its spurs in World War I and began a period of rapid development immediately thereafter. Although a few psychologists were assigned to clinical duties during World War I, there was no well developed neuropsychiatric program and most of the psychologists who had served as clinicians in the Army returned to academic or industrial positions.

In spite of the slow and laborious development of clinical psychology between the two World Wars, its progress and prestige were sufficiently great that early in the emergency both the Army and the Navy began to recruit psychologists for clinical duties. True, the Army called them "Personnel Consultants" during a large part of the war, but eventually several hundred psychologists were accorded a commissioned status and were known as clinical psychologists.

Both of the military services made extensive utilization of the services, techniques, and tools of the personnel psychology, but the magnitude of the personnel problem was such that the additional skills and techniques of the clinician were also in demand. This was especially true in the problems of screening and assigning of large numbers of new recruits. Experiences of World War I, together with general advances in psychiatry, had resulted in an increased awareness of the importance of neuropsychiatric screening. Because of the extreme shortage of psychiatrically trained medical officers, psychologists—regardless of their pre-

vious training or experience—were assigned to reception centers and to basic training camps and were given opportunities for responsible clinical work. At these centers they learned to work as members of the neuropsychiatric team.

A parallel wartime situation existed in civilian services—in induction centers and in hospitals and clinics. Everywhere there was an overwhelming shortage of physicians and psychiatrists, and here, too, psychologists were given new and broader clinical responsibilities.

With the progress of the war, attention was shifted from the problems of screening and assignment to that of caring for casualties—a large number of which were neuropsychiatric. Again because of the continued shortage of trained medical personnel, anything approaching an adequate neuropsychiatric program was possible only by utilizing the services of auxiliary professional people—especially clinical psychologists and social workers.

Thus the Services began using what has become known as the "team approach" in supplying neuropsychiatric services. Begun originally as the only available means of meeting the patient load, its success was such as to convince even the skeptical of its basic soundness. Psychiatrists, clinical psychologists, and social workers —all traditionally somewhat skeptical of the ability, training, and province of each other's professional group—had an opportunity to discover the unique contributions which each could make to the job at hand. And because of the pressure of the load there was no time to engage in specious arguments about the

proper duties of each individual member of the team.

I do not mean to imply that every neuropsychiatric unit was staffed by such a harmoniously functioning team as I have suggested. There were, of course, wide differences in the abilities, personalities, and experiences of the psychiatrists, psychologists, and social workers constituting the teams. It must be admitted that, in some instances, the team existed in name only. In general, however, this teamwork experience was agreeably surprising to its members and the team approach was sufficiently successful to have been retained in the present organization of the military medical services. More important, in terms of subsequent developments, the team was adopted as a basic concept by the Veterans Administration.

The concept of a neuropsychiatric team composed of a psychiatrist, a clinical psychologist, and a social worker did not originate in the military services. It had been successfully used earlier in many child guidance clinics established under the direction of the National Committee on Mental Hygiene. The essential difference between these and the later wartime teams seems to have resulted from the pressure of the load being handled. Traditionally, the clinical psychologist on the staff of a child guidance clinic was likely to have been assigned a relatively inferior role, his duties limited largely to determining mental status. In the service neuropsychiatric unit the psychologist was often overwhelmed at the number and variety of clinical responsibilities thrust upon him, which sometimes, and more often than not, included unofficial but

major responsibilities for both diagnosis and therapy.

Thus clinical psychologists returned from the Services with a far broader background of experiences and outlook than had characterized clinical psychologists before the war. Some wondered where they would find opportunities for professional employment consonant with their newly acquired conception of an appropriate professional role.

And then came the revolution in the Veterans Administration. There are more than twenty million veterans, or roughly one out of every seven persons in the population. Faced with providing medical care for a large proportion of these veterans, officials in the Department of Medicine and Surgery of the VA began to plan for a medical service second to none in the world. By eliciting the co-operation of medical schools and outstanding medical specialists and by introducing the most advanced medical procedures and techniques of medical rehabilitation, a promising start has been made.

Since nearly two-thirds of all veteran patients are neuropsychiatric, the task of expanding and improving the neuropsychiatric service was a major one. One of the first steps was the establishment of the neuropsychiatric team as a basic unit in all neuropsychiatric services whether in hospitals or outpatient clinics. This meant that for the first time the Veterans Administration was to employ clinical psychologists in a professional capacity, and overnight hundreds of new positions were created.

Although in itself impressive, the number of new

positions for clinical psychologists was not nearly as revolutionary as certain other decisions of the Veterans Administration regarding appropriate standards of training, experience, duties, responsibilities, and salaries of clinical psychologists. The announced policy was that the status of the clinical psychologist was to be comparable to that of the physician in every way compatible with law and best professional practice.

Even before this momentous decision on the part of the Department of Medicine and Surgery, another Branch of the Veterans Administration, the Division of Vocational Rehabilitation, confronted with the more immediate problem of providing vocational advisement to millions of veterans, began employing thousands of specialists trained in counseling and guidance. The professional requirements established for these positions were not so high as those announced for clinical psychologists, and the possibility of securing a higher rating and salary in such positions resulted in many clinical psychologists accepting a position as vocational counselor rather than a lower rating as a clinical psychologist. Later, the Division of Vocational Rehabilitation established the positions of Personal Counselor calling for the essential training and skills of a clinical psychologist. Thus, although not employing psychologists by title, this very extensive program of psychological service in the Division of Vocational Rehabilitation served to reduce greatly the availability of qualified personnel for employment as clinical psychologists in the neuropsychiatric units.

This shortage of personnel had many facets. There

were not enough qualified people to fill the newly created positions even at the lowest professional level; worse still, it developed that it was not possible to secure experienced and qualified clinical psychologists to fill the higher rated jobs involving supervision and administration. Nor did it appear that this situation was likely to change in the future. Experience after World War I indicates that the veteran population receiving medical care does not reach its maximum until twenty to twenty-five years after the cessation of hostilities; furthermore, that the proportion of neuropsychiatric cases remains relatively constant. To provide anything like adequate service to the anticipated number of patients, the Veterans Administration must plan to employ more and more professional persons for at least a quarter of a century.

Faced with both the immediate and continuing shortage of professional personnel, the officials of the Veterans Administration were forced to make a difficult choice. They either had to lower the recently established high standards of professional personnel, and thus employ persons not otherwise eligible, or they had to undertake to support a long-time and expensive program of training for professional personnel. Convinced of the absolute necessity of maintaining professional standards at the highest level, it was decided to begin an extensive training program under the provisions of Public Law 293. This law had fortunately provided for such an exigency, and immediate plans were made for extensive training programs for a variety of medical specialists, including psychiatrists.

Unfortunately, due to an oversight in preparing Public Law 293, no provision had been made for training of clinical psychologists to supply the needs of the Veterans Administration. Under the circumstances, I am sure, the temptation must have been very great for the officials in charge of the clinical psychology program in the Veterans Administration to abandon their ideal plans for the utilization of well-trained clinical psychologists as an integral part of the neuropsychiatric service. But the men in charge of this program were not easily dismayed. Instead of giving up their program and complaining about the inadequacy of Public Law 293, they faced the situation realistically, and evolved a plan which I predict will constitute a milestone in the history of professional psychology. I refer to the special training program in clinical psychology described in Veterans Administration Circular No. 105 of 1946.

This circular outlined a training program in clinical psychology worked out in close collaboration with the American Psychological Association and the departments of psychology of universities approved by the American Psychological Association as qualified to give complete training in clinical psychology. Confronted with the impossibility of paying trainees directly while they were undergoing training in clinical psychology (an arrangement which was possible under Public Law 293 for psychiatry and other medical specialties) a plan was devised whereby a qualified veteran candidate for this training program might secure the Ph.D. in psychology at the university of his choice

while receiving a respectable income by virtue of his benefits under Public Law 346 (or 16) and a salary for part-time work in the neuropsychiatric unit of a Veterans Administration hospital or clinic. Furthermore, this brilliant plan provided for the part-time employment of at least partially trained clinical psychologists, under adequate supervision, in VA facilities and thus served to alleviate what would otherwise have been an almost impossible shortage of professional help in these units.

It is this special training program, more than anything else, that has been responsible for the recent development of clinical psychology in the departments of psychology of our universities. For the first time, students in many institutions find it possible to obtain training in clinical psychology within the department of psychology.

Thus began a series of headaches for departmental chairmen. First and most serious was the problem of securing qualified personnel to teach courses in clinical psychology and to provide adequate supervision for the psychologist trainees on the job. There began a mad scramble for the relatively small number of qualified and as yet unemployed potential instructors and professors. In some institutions this situation has had the salutary effect of encouraging a co-operative program between the department of psychology and departments offering related courses essential for a good training program in clinical psychology. In spite of administrative headaches, however, in spite of scheduling difficulties resulting from the fact that trainees were working part time in VA installations

often miles away from the local campus, in spite of the delays and red tape in completing Civil Service appointments—yes, in spite of these and many other headaches, this special training program is proving to be a success.

I do not mean to imply that the program is a perfect one. I do believe, however, that it is a successful one and that with increasing experience it will become better. It also promises to stimulate improvements in training programs of other applied fields.

That the program has been successful is indicated on all sides. The students in training, in spite of heavy schedules, are uniformly impressed with the quality of the training and with the unusual opportunity which they have of making almost immediate and practical application of the facts and techniques which they are learning. Professors in charge of courses being offered to these trainees, again although often teaching heavy loads, seem to be impressed with the unusual opportunity of participating in this professional training program and are challenged by the responsibility of teaching students with high professional motivation and intense interest in their field work. That university departments regard the program as a success is indicated not only by the fact that all of the original participating institutions intend to continue the program but also by the fact that practically every other qualified university department plans to begin participation in the program next year. Finally, we can report that the Veterans Administration hospitals and clinics in which these trainees are working on a part-

time basis have been favorably impressed by both quality and quantity of professional service which these trainees have rendered under adequate supervision.

The success of this program, it seems to me, stems largely from certain very wise decisions on policy made at the outset. University departments retain full autonomy with respect to the selection of candidates for the training program and for the curriculum under which the students are trained. They have, however, been urged to participate in a continuing exchange of curricula; and while not enforced by central authority to adopt any standardized program, each departmental staff has been led to evaluate its course offerings and to plan new courses with a view toward strengthening its own training program.

Again, very wisely, in my opinion, the Veterans Administration did not set itself up as an arbiter or judge as to which university departments of psychology were or were not qualified to offer training in clinical psychology. Instead, by requesting the American Psychological Association to prepare a list of approved institutions, this organization of psychologists was forced for the first time to give serious consideration to an adequate training program in clinical psychology. Although this plan was not originally welcomed with open arms by certain departmental chairmen who felt that their institutional rights and privileges were being encroached upon, my experience as a member of the Committee on Graduate and Professional Training, to which has been delegated the responsibility of approving institutions for training in clinical psychology,

has convinced me that little harm and much good will result from the processes of professional self-policing and accreditation. While I do not believe that we will ever reach the point where there should be complete uniformity of curricula from institution to institution, I can hardly see how any profession can hope to assure itself of adequately trained members unless a certain minimum control is exercised with respect to training requirements and curricula.

That I am not alone in this conviction is best indicated by the fact that at the most recent meeting of this committee there was unanimous agreement of all ten members, of widely varying training and background, concerning just what the minimum essentials of an adequate training program should be. Since the formal report of this committee will be published elsewhere shortly, I shall not here attempt to give you the details regarding the standards of training established by the committee but will summarize the essential results of our group thinking concerning these matters. Let me emphasize again that all of these conclusions represent unanimous opinion of all members of the Committee on Graduate and Professional Training.

The first general conclusion is that the clinical psychologist is first a psychologist and then a clinician. The committee's decision in this matter represents a very widespread opinion among both clinicians and nonclinicians that the Ph.D. degree, no matter in what area of psychology, should mean that the individual holding it has received appropriate training in the basic science and has developed the conception of re-

search and scholarship implied by that degree. In line with this conviction and further consideration of the minimum curriculum requirements in the specialty of clinical psychology, the committee agreed that any approved training institution must require all clinical students either to take courses or to pass comprehensive examinations in the following fields: statistical methods, experimental methods (laboratory, research methods), systems or theories of psychology, and personality theory (psychodynamics).

The second conclusion reached by the committee was that the clinical psychologist during his course of graduate training should come in contact with several different qualified graduate teachers in both clinical and nonclinical fields; this is to insure that he will be influenced by teachers with a diversity of interests and points of view both in academic courses and in supervised clinical experience. The committee tentatively set the following minimum figures: at least seven graduate teachers, three of whom teach graduate courses in clinical psychology. The minimum combined teaching load of these three must equal the teaching load of one full-time graduate teacher.

The third point on which the committee agreed was this: the training of clinical psychologists must include supervised clinical experience in a variety of clinical facilities, each of which is supervised by an adequately trained clinician. To be specific, the committee decided that this should be interpreted to include at least three different practicum facilities, in each of which there is at least one qualified practicum

supervisor; further that, as a minimum, these three facilities must include (a) a psychiatric facility in which the student will have opportunity to work in a team relationship with a psychiatrist, (b) a children's clinic, and (c) one additional practicum, providing for still another type of clinical experience.

The preceding discussion is predicated on the assumption that clinical psychologists should complete a doctoral degree and that it should be the Ph.D. Many trainees and some practicing clinicians have asked if it is not time to consider the possibility of a specific professional degree, for instance, Doctor of Clinical Psychology, to be given in a separate School of Psychology. Proponents of this suggestion argue that it is not reasonable to try to make scholars and researchers out of all clinicians, that what we need are better trained clinicians, hence more of the available training time should be devoted to learning additional clinical techniques and to acquiring additional practical experience in their use. Some even go as far as to contend that the Ph.D. program with its emphasis on rigid experimental design and objective, critical thinking tends to interfere with the development of clinical insight and empathy needed by the successful clinician; therefore, we should have a strictly professional degree which does not emphasize training in research and experimental methodology.

With this conclusion I cannot agree. Our basic knowledge of the problems of mental health and our techniques for applying psychology to the solution of personal problems are still woefully inadequate. To

establish a strictly professional degree, and thus to train a group of exclusive practitioners in clinical psychology at this time, would, I fear, tend to retard the progress in the field and to crystallize further many practices which time will show to be relatively ineffective as well as inefficient. The unique potential contribution of the psychologist to the mental hygiene team is his ability to look at old problems in new ways and to carry out research directed both at immediate professional needs (for example, new tests and other techniques) and also at the discovery of new knowledge necessary to improve our understanding of the underlying problems of mental health. Until we have evidence to the contrary, I shall continue to believe that students properly selected with respect to aptitude and personality characteristics can be made into good clinicians and good researchers in the same training program. I see nothing incompatible with a student developing high regard and skill for statistical techniques and, at the same time, becoming highly insightful in the use of projective techniques in certain types of clinical situations for which, as yet, we have no more objective tools. In fact, I would be willing to argue that a clinician, so trained, would be a better clinician as well as one more likely to make research contributions, than would a clinician trained exclusively in the use of clinical techniques.

It should be noted that not all clinical psychologists are convinced of the desirability of accepting membership on the staff of the neuropsychiatric team as the most appropriate role of a clinical psychologist. It is

argued that because of the traditional dominance of the psychiatrist on such teams, the psychologist has little to gain and much to lose by becoming a member of such a team—furthermore, that the clinical psychologist is often better equipped than the psychiatrist or social worker to assume full clinical responsibility for certain types of clinical problems, for instance, educational, vocational counseling, behavior problems in children, functional speech defects, and the like. With respect to this argument, I wish to make my own position perfectly clear: I believe in the essential superiority and validity of the team approach for neuropsychiatric service only if it is truly a teamwork proposition, that is, only if each member of the professional team is made a full member of the team and given duties and responsibilities commensurate with his ability, training, and experience. Let us not forget that professional competency, in any field, involves an appreciation of one's professional limitations as well as one's capabilities. My belief in the superiority of the team approach is based on a firm conviction that the problems of mental health and care are too complex and too ramified to be handled adequately by a single member of any existent professional group working as an individual. By this I do not mean that there should be no psychiatrists nor psychologists holding specific jobs in schools, colleges, or institutions, or engaged in private practice as individuals. Obviously, the current shortage of professional personnel and the inadequacies of local budgets make it ridiculous even to consider establishing a full-fledged men-

tal hygiene team in every situation in which a psychiatrist, clinical psychologist, or social worker is now functioning effectively as an individual. However, the competent and ethical specialist engaged in isolated practice must recognize the limitation of his individual professional functioning, and seek wherever possible the co-operative assistance of related specialists. Even where such specialists are not locally available, the individual practitioner must not overlook his indebtedness to members of related professions of the larger team responsible for the general advancement of the broader field of mental health.

Since it would seem grossly impractical and uneconomical to think of training a group of super-clinicians, that is, to make any professional group fully competent in the fields of knowledge, the specialized techniques, and with the professional tools now available to the three specialists on a neuropsychiatric team, I am personally convinced that the team approach is a practical one. Obviously, this does not preclude the desirability of an occasional student completing his training in two or even three of the three professional fields if he has enough ability, time, and financial resources! Furthermore, with improved training on the part of all three professional groups (at least a portion of which I trust will be common) and with the increased experience of teamwork, I have high hopes for the future of the neuropsychiatric team. The exact role of the clinical psychologist on a neuropsychiatric team is still not clear, but as far as the VA team goes, it is already possible to outline it broadly. According to the published

official description of duties, clinical psychologists in the Veterans Administration will participate in diagnosis, therapy, and research.

But, it should be noted, the psychiatrist and the social worker will also participate in these same duties. Does this mean that all team members will be engaging in the same combination of specific activities at the same time? If so, the potential value of the team approach is obviously lost; the team will turn out to be nothing more than a group of general practitioners who happen to work together in the same unit. No, the team concept should mean that each member will participate in all activities of the unit, but each according to the particular types of knowledges, techniques, and skills which he brings to the team. Thus for example, I would expect that all important decisions regarding a patient would be based on neurological, physiological, and other findings of the psychiatrist, on intellectuality, personality, and other findings of the psychologist, on family background, cultural, and other findings of the social worker—with all findings reviewed and integrated by the team in an effort to arrive at the best decisions and recommendations relative to the patient's future welfare.

Note that I did not use the word diagnosis. With the increasing appreciation of the dynamic nature of most neuropsychiatric conditions, diagnosis, in the sense of labeling, typing, or pigeonholing of cases is gradually disappearing. Diagnosis that is not also a prognosis is meaningless categorization—and certainly does not help the patient! Useful diagnosis, at a minimum, in-

cludes a reasonably adequate description of the patient's present condition, the most likely evaluation of the physical, psychological, social, and cultural factors which seem to have brought about his present condition, and a series of hypotheses regarding the future course of his behavior if the patient is subjected to a variety of different therapeutic procedures (including intelligent neglect!). The final decision concerning *which* specific therapeutic procedure, and the planning for the management of the patient must again be a team decision, based not alone on the probable success of the procedure, but also on the availability of therapeutic resources in the unit and on the positive and negative assets of the community.

Note here I am using the term therapy in a very general way to include all things that may be done to help solve a patient's problem. Some therapy involves the use of drugs; it would seem only sensible to assign it to the one member of the team whose training qualifies him to use them. Unless the clinical psychologist's training is to be expanded to include *Materia Medica* and such other courses as will permit him to be licensed to prescribe drugs—I cannot see how we should expect him to deserve (or even want) responsibility for chemotherapy. Other types of therapy, let us say environmental manipulation, or modification of the attitudes of the members of the patient's immediate family, involve skills in which neither the psychiatrist nor clinical psychologist have been especially trained, so it would seem reasonable that such aspects of therapy be assigned to the social worker whose training and

experience uniquely qualifies him for such duties.

When it comes to the several varieties of psycho-therapy—for instance, supportive, directive, nondirec-tive, analytical, and the like, the situation is not so obvious. Present evidence indicates that *some* psychi-atrists, *some* psychologists, and *some* social workers are effective in such interpersonal therapies while other members of each professional group prove themselves equally ineffective. And even the successful therapist finds that he is relatively more successful with certain types of patients than with others. In the light of this situation, it would seem wisest that each neuropsychi-atric team should share the case load of dirèct psycho-therapy among its staff members on the basis of the training, experience, competency, *and other duties* of each member of the team. Thus, if the clinical psychol-ogist is competent in one or more varieties of psycho-therapy, he not only may, but in view of the patient load, will probably have to engage in psychotherapy as an integral part of his regular duties as a member of the clinic team. This means that the psychologist will need both courses and supervised practice in psy-chotherapy as an integral part of his training. But even if he were not expected to carry a part of the load in psychotherapy, such training would still be essential for the most effective use of psychological tools in mod-ern diagnostic practice and for planning and carrying out pertinent research on psychotherapy.

The description of duties of a clinical psychologist in the Veterans Administration states that the clinical psychologist "carries out individual or group therapy

under the direction of the responsible neuropsychiatrist" . . . who "will delegate such therapeutic duties only when he believes the individual clinical psychologist to be fully competent to handle the case." This provision has caused some observers to doubt the sincerity of the announced intention to make the clinical psychologist a full-fledged member of the neuropsychiatric team. Personally, I cannot share this concern. Some one person on the clinic team must assume both the legal and moral responsibility for the welfare of the patient. On the basis of types of training and experience of present-day psychiatrists and clinical psychologists, I should, if I were a neuropsychiatric patient, certainly prefer to have this responsibility assumed by the psychiatrist. Naturally, I should want him to utilize the services of all available specialists, but I would not be happy to have him delegate me completely to any other professional person whose training and experience did not equip him to assume final responsibility for my total welfare.

Now some may argue that the training of the clinical psychologist should be broadened to include whatever parts of the physician's training may be necessary to equip him to assume this legal and moral responsibility for the patient's total welfare. With this I cannot agree. To do so would mean either that his training program would have to be greatly lengthened or that it be shorn of much of what we noted above constitutes the minimal Ph.D. training for a clinical psychologist. To any student psychologist who yearns to practice psychiatry and to assume the full responsibil-

ities of the physician, I would say, "Fine! What you should do is to transfer to medical school and get an M.D. degree." I can see no more reason for departments of psychology undertaking to train physicians than for medical schools trying to train psychologists. It is to be hoped that the future training programs of both will include a reasonable number of common courses so that the psychiatrist and the clinical psychologist will be able to think, work, and carry out research in a more effective and co-operative manner, but I do not believe the time has come to attempt a merger of the two professions. For while we are confronted with a very serious need for large numbers of professional persons equipped to render clinical services, there is an even greater need for new knowledge and new techniques, if the combined efforts of all clinicians are to be adequate to meet future demands for neuropsychiatric services.

Such new knowledge and techniques will come only as the result of fruitful research. And of the three professional specialists on the mental hygiene team, the clinical psychologist is the one best qualified by both training and experience to assume the major responsibilities for research on clinical problems. This is true whether the data happen to be physical, physiological, behavioral, introspective, or social. This does not mean that the psychologist will, or should be, the only member of the team to engage in research. Just as all members of the team participate in diagnosis and therapy, I would hope that all would contribute to the formulation of problems, to the co-operative collection of data,

and to other aspects of the research. But good research programs do not just happen; they are most likely to result when an able person accepts research as his major responsibility, one whose training and experience enables him to design and conduct pertinent and rigorous investigations and then integrate the findings with previous knowledge. Some psychiatrists and social workers are so qualified, but not by virtue of their professional training and experience. The clinical psychologist, on the other hand, in the course of obtaining the Ph.D. degree, is supposed to acquire not only the inquiring attitude of the researcher, but also the necessary techniques of experimental design, control, and analysis. As psychologists, we must not dodge this challenge to make research contribution.

It it not too surprising, therefore, to find that the clinical psychologist in the VA is directed to assume a major responsibility for the research programs of neuropsychiatric teams and allotted approximately one-third of his working hours to research. While at first this may appear to be an unexpectedly liberal attitude on the part of a government service agency, it can be justified on grounds other than that of offering the clinical psychologist an opportunity for pleasant working conditions.

Consider these facts: we do not yet know which, if any, behavioral syndromes are really functional unities and which are merely illusionary clusters based on faulty observation and classification; we do not know the etiology and factors affecting the development of most so-called nonadaptive syndromes; we know very

little of the relative merits of the different psycho-therapeutic techniques and their probable effectiveness in specific person-condition situations; we know perhaps still less about who makes a good therapist—and why; and finally, although there has been much written about preventive psychiatry and mental hygiene, we still have practically no basic research on these problems.

Similarly, our tools for differential diagnosis and for evaluating the success of therapy are still all too crude and uneconomical. While admittedly better than none, and superior to the ones formerly available, there is still a great deal of room for improvement. I am not willing to believe, for example, that the maximal use of the clinical psychologist's time and energy always results from routinely administering, scoring, and interpreting the same two and only two psychological tests for all types of patients!

With such abundant ignorance at our disposal, it may be wondered whether we should attempt to engage in clinical services at all. Perhaps we should declare a moratorium on service and devote all of our energies to research on clinical problems. Such an extreme decision, I'm sure you will agree, is neither likely nor wise. Humanitarian considerations force us to do all we can to help those in distress. But even more important is the fact that productive research bearing on neuropsychiatric problems is not likely to result unless good research minds are fertilized by actual contact with clinical materials.

There would seem to be at least three reasons for the

paucity of high grade research on the problems of mental health. First, the problems themselves are extremely complex and, hence, difficult of solution. Second, relatively few clinicians (including psychologists) who have in the past come into contact with clinical problems have had the necessary training even to formulate, much less to execute, significant research projects. Third, our better research psychologists have remained so completely insulated from the realities of clinical problems that they have not been stimulated to undertake research in this field. It is not insignificant, I think, that the conventional course in experimental psychology is not likely to include even one experiment on waking suggestibility or any other topic of abnormal psychology. Maybe I am being too generous here; perhaps research psychologists have avoided attacking clinical problems for the same reasons they have generally avoided crucial research in personality dynamics, interpersonal relationships, and certain other areas of psychology which have not seemed readily amenable to an experimental attack.

In suggesting that the primary responsibility of the clinical psychologist should be research, let me emphasize that I do not believe he should do only research. Without intimate participation in the processes of diagnosis, therapy, and the management of patients, he is not likely to develop the hypotheses and insights which must precede significant research contributions. On the other hand, it would seem most unfortunate for future developments if psychologists were to become so completely absorbed in the routine day-to-day

application of techniques based on our limited present-day knowledge that they do not have time to make positive contributions by way of new knowledge and improved techniques.

I have no illusion that a few hundred clinical psychologists trained in research methods will result in an early solution of the many unanswered problems of neuropsychiatry and mental hygiene. But in spite of the complexity of the human personality and the deviousness of its aberrations, I do believe we are on the threshold of exciting research adventures in which the clinical psychologist will play a leading role. Although some of this research will inevitably be oriented toward immediate and practical ends, there seems reason to hope that much of it may be of a fundamental nature and as such, of as much interest to the general psychologist as to the clinician. Cattell has recently admonished psychologists for ignoring the basic problems of personality research as follows:

"Although the endless variety of colorfulness of human personality intrigue the artist and challenge the ingenuity of the scientist who function together harmoniously in the mind of any good psychologist, many psychometrists have nevertheless fled from this richness of human nature as from some fearsome incubus. They have left reality to the novelist, and escaped into the cloistered order of the laboratory, where the husk of measurement may be exhibited even when the kernel is lost. Some experimentalists have thus gained what is really a barren scientific victory either by maneuvering themselves into false assumptions about

human nature, or at the price of relinquishing three fourths of the wide domain of human behavior."[5] Whether this criticism is fully justified or not, it must be admitted that an unfortunate gap has existed between the thinking of the general psychologist and that of the clinician, whether psychologist or psychiatrist. Psychiatry may be criticized for its failure to exploit many basic discoveries in psychology, but at the same time we must remember that major contributions to psychological theory by psychiatrists have not always been graciously accepted by general psychologists even as hypotheses for research. In part, this lack of understanding has resulted from different terminologies, but the problem is not merely one of semantics. And unfortunately, many persons interested in the dynamics of personality are not inclined to subject theoretical constructs to experimental validation.

Thus the revolution in clinical psychology is likely to have far-reaching effects on courses not ordinarily considered to be "clinical." Graduate students in daily contact with clinical cases are not going to be satisfied with unrealistic theories of motivation or emotion and even less with the absence of key courses in the training curriculum. Even those professors who do not offer clinical courses are likely to find themselves stimulated to do some thinking—and perhaps even some research on problems heretofore conveniently overlooked.

These then are some of the current trends in clinical psychology. I trust you will forgive me for orienting so much of my talk around the special program of the Veterans Administration. I have done so—not in an

effort to sell this program—but because, in a very real sense, it is the story of clinical psychology today. I do not have time to tell you of the plans of the Mental Hygiene Division of the U. S. Public Health Service for an exciting training and research program in mental health, which promises to be fully as significant for clinical psychology at the VA program. Dealing as it will with the mental health of all groups, it will include emphasis on child guidance and other topics not cogent to the medical care of veterans. Nor do I have time to more than mention the important problem of developing and validating suitable procedures in selecting the most promising candidates for training in the special programs[12] and for eventual membership in the emerging profession of clinical psychology.

To revert to our earlier analogy, it would appear that the once rejected child is growing up, and fortunately for its future emotional stability, the rejecting parent has now apparently reached a stage of maturity which will permit the child to work out its adolescent problems within the family circle. As we have noted, its problems are many and the growing pains are not yet over. Still other problems are ahead. Full professional maturity will not be achieved until we have certification and licensing, and I hope that national certification will come quickly enough to assure uniformity in licensing from state to state. Another problem is that of developing and fully accepting an adequate code of professional ethics. Only then will clinical psychology be ready to assume its role as a fully mature member of the family of professions.

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PSYCHOTHERAPY

Carl R. Rogers

IT IS quite clear that the most obvious trend in relation to psychotherapy is the sharply increased professional interest in this field. Among clinical psychologists, psychiatrists, and social workers marked attention is now being given to therapy. For the most part this represents a healthy reaction against too great a concern with description, analysis, diagnosis and labeling. Professional workers have gradually come to realize that there is little value in an elaborate diagnostic study of the individual, if this is all that can be offered. This realization has led them to concentrate their efforts much more strongly in the field of therapy, utilizing and investigating every procedure which offers promise. It is out of this accumulating stream of practice, research, and theory that we shall attempt to discern those directions which seem to have significance for the future.

The Objective Consideration of Therapy

It appears that there is emerging in the field of psychotherapy a willingness to look at the facts, a willingness to regard objectively what is being done. Thus we find now available, either in published form or in typed form for research workers, complete ver-

batim recorded cases of client-centered therapy,[3, 4, 5, 6, 7] hypnoanalysis,[2] psychoanalysis,[1] and group therapy. There are also extensive verbatim case excerpts from play therapy[34, 42] and directive therapy.[26] It is perhaps significant of the changing status of the professions in respect to psychotherapy that there is, to the best of the author's knowledge, no verbatim therapeutic case handled by a medically trained therapist available either in published or unpublished form. All the published cases have been conducted by psychologically trained therapists.

Not only is there a greater willingness to present the raw data of therapeutic experience, but there have been a number of beginning attempts to apply the logic and the methods of objective science to the analysis of the therapeutic process, the techniques of the counselor, and some of the personality constructs which reveal themselves in therapy. For the most part these are but beginnings, and they fall short of the standards of objectivity which have been attained in some other fields of psychology. We do know, however, for the field of client-centered therapy at least, thanks to recent published research, something of the characteristics of the therapeutic process as it takes place in successful cases, and something of its impressive similarity from client to client.[9, 15] We know some of the elements which are involved in the gaining of insight, and in the perception of relationships between experiences.[8] We know a little about the fashion in which the individual's concept of self changes during therapy.[12] We have made a beginning in measuring

objectively the personality changes which are brought about through therapy.[10]

This means that the field of psychotherapy is being brought out of the realm of the mystical, the intuitive, the indefinable into the full light of objective scrutiny by psychologists. It has become another process which can be described, studied, analyzed, correlated. This does not necessarily mean that it can be or is being studied by the same type of techniques heretofore utilized in psychology. Many of these are not sufficiently subtle. The search is on, among research workers in psychotherapy, for methods and techniques which will be as scientific as any used heretofore, but which will be adapted to the subtleties of psychotherapy, and to its holistic nature. When we are studying a process in which a client's discussion of her feelings about her mother is followed by the disappearance of a persistent asthmatic condition, it appears clear that research techniques which treat the individual as an organized whole will get further than a study of conditioned reflexes. The struggle to develop appropriate research procedures will be, in all probability, one of the significant future trends.

Psychotherapy, then, is coming out of its darkened corner into the steady light of research analysis, and the avidity with which younger psychologists are turning to this field testifies to their clinical conviction that there is much of dynamic significance to be learned by such study. But what of the trends within therapy itself? What directions are discernible in the practice and in the theory of those in the field? It would appear

that there are trends toward greater difference of opinion on some points, and trends toward increasing similarity on others. Let us first examine a divergent trend which seems to grow sharper every year.

The Divergent Concepts of the Therapist's Role

There is an increasingly well-defined difference, evidently based upon differing clinical experience, between those who believe the client should be subtly guided toward an independence which is to some degree defined by the therapist, and those who believe that growth forces are present in the client, and that if these are released, the client will himself move toward a self-defined independence. Although the ultimate goal is somewhat similar—to establish the client as an independent and responsible person—the route by which this is reached is, on the one hand, tactful guidance and direction, and on the other hand, release of the individual's strength and capacity.

There are some interesting anomalies in this bifurcation. Freudian analysis, which initially prided itself on its noninterference with the client's choices and directions, has become, through some of its modern exponents, an advocate of guidance and intervention. Alexander and French, and also Karen Horney, are outspoken in their intention to plan and direct the course of the therapeutic process, through interpretation, the use of "directives" to the client, manipulation of the client's environment, and the like. Thus the therapist is to ask himself such questions as these: "Shall we suggest that the patient come for daily inter-

views? Weekly interviews? How much shall we try to change conditions in his daily.life? Shall we encourage or limit the development of the transference relationship? And how much shall we try to accomplish in this case—what is our goal?"[16] [p. 104] While this guidance is intended primarily to function during the period of therapy, and the later independence of the individual is regarded as desirable, the procedures advocated involve considerable control of the outcome. When the therapist decides what is the goal of therapy in the case, it appears obvious that the independence he proposes to grant to his client is a limited independence. One prominent .therapist has stated in a professional meeting that he does not wish to adjust his clients to the status quo—instead he leaves them "healthy rebels." The fact that he regarded it as his prerogative to decide where they should be "left" seemed completely to have escaped his notice.

Ranged on the other side are those who believe that the most effective therapy is that which has the deepest respect for the integrity of the individual and for the right of the individual to choose his own direction, both in the therapeutic situation and in life. The clinical experience of this group supports them in thinking that it is the individual, and the individual alone, who can know the nature of the stresses and strains within his psychological life. It is only the individual who can truly perceive these factors and see the function they have performed in his psychological economy. It is only the person himself who can assimilate these insights, or who can choose from among the many pos-

sible courses of action. Thus these therapists continue to search for the psychological conditions which facilitate self-exploration and self-knowledge. Their aim is to supply those conditions which most fully release the capacity of the individual to examine and understand himself, and to reorient himself in relation to his world of reality. In opposition to the flexible manipulation of therapeutic technique from interview to interview by the therapist, as advocated by Alexander and French, they favor the establishment of thoroughly consistent conditions of acceptance and understanding which the client can freely utilize in working toward his own growth. Typical of such therapists would be the group which is interested in client-centered or non-directive therapy,[19, 24, 25, 42] and also others whose viewpoint is closely allied—Frederick Allen,[17] and others among the psychiatrists, Roethlisberger and Dickson[51] and Cantor[47] in the industrial counseling group.

It is perhaps worthy of note that within this client-centered stream of thought the trend has been toward the elimination of any traces of subtle directiveness, and more complete concentration upon ways of freeing the client to use his own strength. The writer's own book, *Counseling and Psychotherapy,* published in 1942, contains in the case illustrations and in the discussion, many instances of interpretation and evaluation by the counselor which show a reliance upon counselor strength rather than client capacity. These would no longer be regarded as useful or justified by the group working in client-centered therapy, and they are steadily being eliminated in practice.

Among psychiatrists and psychologists who term themselves eclectic it would also seem to be true that the trend is away from those practices which maximize the role in therapy of the therapist, and toward those which maximize the role of the client. Suggestion, persuasion, advice, supportiveness are increasingly regarded as clinically ineffective, are being replaced by procedures which place more stress upon emotional release and client initiative. Thus we find such terms as release therapy, passive therapy, minimal activity being used to describe methods in which the therapists role is a noncontrolling one.

Another interesting aspect of this situation is that the group which in the past has been most firmly wedded to a philosophy of guidance, the traditional counseling and vocational guidance group, is showing unmistakable trends in the direction of endeavoring to build on the client's capacity to guide himself. One example among several which could be cited, is the shift which is evident in the writings of J. G. Darley. His published views in 1943 include many references to the counselor's full responsibility for the situation. The counselor plans and carries the interview, "keeping control of the interview," persuading and explaining. It is his task to "see that (the) plan of action is carried out." "In many respects the interview seems somewhat similar to a sales situation, since the counselor attempts to sell the student certain ideas about himself, certain plans of action, or certain desirable changes in attitudes."[21] (p. 169) Yet in a 1946 publication of Darley's there is a marked change in emphasis. One

cannot find the word "persuade" in it. The stress is upon helping the client to learn for himself. The counselor must exercise restraint. "Whenever the interviewer starts to impose his ideas on the client, it would be well for him to beware of his own inclinations to dominate."[20] (p. 9) The whole presentation shows much less assurance that the counselor knows best, much more awareness of the fact that it is only that which the client assimilates and chooses for himself that is effective.

While it would be most erroneous to assume that the group which has traditionally been associated with counseling and vocational guidance has suddenly become client-centered in their approach, there can be no doubt that the trend is clearly in the direction of relying much more heavily upon the strength which is in the client.

Thus we see some elements within psychoanalysis and psychiatry taking even more responsibility for the life of the client than has been true in the past, while on the other hand the eclectic therapists and the traditional counseling group move toward a greater appreciation of client responsibility, and the nondirective group shows a clear trend toward becoming more completely nondirective.

The significance of this whole issue should not be underestimated. Involved in it are such deep psychological and biological questions as these: Is there a tendency in organic life to move in the direction of growth? Is the only effective learning that which is self-assimilated? Can the individual know himself, or

can he be known only to the expert? Do we best under-
stand the person from an external frame of reference,
as psychology and psychiatry have assumed in the past,
or do we most deeply understand him from his own
internal frame of reference, seeing the world of experi-
ence through his eyes? Significant problems of social
philosophy are also involved in these diverging atti-
tudes regarding therapy. If objective study supports
the conclusion that dependence, guidance, and expert
direction of the client's therapy and life situation are
necessary for adjustment and eventual independence,
then a social philosophy of expert control is clearly
implied. If further research indicates that the client
has at least the latent capacity to understand and guide
himself, then a psychological basis for democracy
would have been demonstrated. It is therefore an issue
in which sound research is vital.

The Emergence of Similarities

In spite of the deepseated divergence mentioned
above, there is ample evidence that continuing clinical
experience with therapy is bringing workers of varied
orientations into a considerable degree of agreement
upon many significant points. It is this continued ex-
perience with and observation of therapy which should,
in the long run, do away with "schools of thought" in
psychotherapy and substitute instead a body of clinical
knowledge and research in which principles are ac-
knowledged to be true because they are supported by
careful observation and evidence.

As an illustration of this trend toward similarity based upon observation of experience, it is illuminating to take the recent work by Alexander, French, and others.[16] With the laudable purpose of questioning psychoanalytic dogmas, the Institute for Psychoanalysis began a study of its actual experience, trying to determine principles by an open-minded study of its cases rather than by appealing to past authority. As a result, they emerge with a series of clinical judgments, many of them in the sharpest contradiction to classical Freudian thinking, and with a total point of view having much in common with other therapists working in the field.

Let us examine a few of their clinical findings, considering their similarity to principles enunciated by therapists of the client-centered school of thought. The following statements summarize some significant conclusions of the Chicago Institute for Psychoanalysis.

That long continued analysis is not necessarily the most economical, penetrating or effective form of psychotherapy.

That weekly interviews may be preferable to daily interviews, and that the setting of daily contacts may seduce the client into a too-dependent, regressive role.

That the real problem of therapy is not to recall the traumatic past, but to bring about permanent changes in the self which would make that self capable of being consciously aware of painful emotional constellations.

That the client does not need to deal with all of his repressed past; that it is his incapacity to deal with present problems which is the focal point of therapy.

That analysis of the past frequently serves only to orient the therapist, and may not be of help to the client.

That positive action by the client in the interview situation, such as acquiring courage to assert himself, has a deeply therapeutic influence.

That much therapy is achieved by the client himself between interviews and after the conclusion of the therapeutic series.

That the transference relationship, with its implications of dependence upon the therapist, of which so much has been made in analytic thinking, is frequently unnecessary and even undesirable in therapy.

That the assimilation of new insight is something accomplished by the client himself, and that the therapist can only create the atmosphere in which this can take place.

It is significant that therapists working from a client-centered point of view would agree, on the basis of their experience, with every one of these conclusions. They have, as a matter of fact, been stated by such writers as Taft, Allen, and Rogers. It only corroborates their truth that a group of analysts have now independently arrived at the same views. While it would be misleading to leave the impression that there are not other areas of sharp disagreement, nevertheless the extent and depth of similarity is impressive.

One may infer that as objective recording of therapy is extended, and as observation and research take the place of a priori reasoning and reliance upon authority, the area of agreement will be enlarged, and that honest workers, no matter what their previous orientation, will gradually discover the effective principles which are operative in all successful therapies.

CURRENT TRENDS

The Development of Group Therapy

No discussion of present currents in psychotherapy could overlook the mushroom growth of group therapy. Although it is easy to criticize this aspect of the professional field, since it is a topic about which there has swirled much talk and few facts, such criticism would be basically unjustified. Group therapy is a lusty infant precisely because a variety of workers have found clinically that it holds some promise for dealing with a variety of personal maladjustments and group frictions. As careful and objective work is done in this field, sound research can discover the vital principles, and can sort the wheat from the chaff of much of our present thinking and practice.

It would be more accurate to speak of group therapies than group therapy, since every viewpoint is represented — didactic, directive, psychoanalytic, eclectic, client-centered, and others less easy to label. Although the descriptive literature on this topic is burgeoning, there are very few objective research studies in group therapy, and only two based upon verbatim recording.[30, 31] Further studies are certain to emerge.

The growing use of group therapy, and the professional interest in it, seems to stem from several considerations. In the first place it appears possible that it may offer a partial answer to the current belief that psychotherapy involves too much time, effort, and money to affect more than a very small fraction of the population. If it is possible through group experience to assist individuals in making better adjustments, the

economy of professional effort involved may make such a procedure applicable in industry, military service, and schools in a way which individual counseling could never achieve.

Group therapy has also earned its significance by proving to be a valuable adjunct to individual therapy. The man who finds it well-nigh impossible to express his hostilities in individual contacts with a therapist may find it relatively easy to voice these same feelings in a group in which others are giving vent to their antagonisms. In reverse fashion, a client may gain courage from a group situation to think more freely about his problem but find it difficult to discuss his personal difficulties in front of others. He may then be able and willing to utilize individual therapy in a way which could not have come about except for the group sessions. Thus individual and group therapy seem certain to continue to supplement each other.

Still another reason for the interest in group therapy is the promise of its wide applicability. There seems to be no reason why it should not apply to the emotional problems inherent in the administrative handling of a staff, or the conduct of a classroom, or the leadership of a labor-management discussion, as well as to the therapeutic handling of neurotics.

From the point of view of theory and practice we find the same divergences and the same similarities which we have noted in individual therapy. Every type of theoretical belief is represented in practice. To some, group therapy is the giving of mental hygiene lectures to neurotic patients, on the assumption that this ma-

terial will be assimilated into behavior. To others, group therapy is a process in which the individual in a group acquires increasing freedom, in an accepting atmosphere, to voice his own feelings and attitudes, gradually clarifying his perceptions to a point where he chooses to redirect his behavior in the light of his altered perceptions. To some, the effective dynamics of group therapy involves the therapeutic relationship of the individual to the leader. Others regard the essential dynamics as the interpersonal reactions of members of the group. Only a greatly increased number of recordings and other objective observations can answer these issues. Meanwhile it is clear that group therapy produces, with considerable frequency, noticeable changes in individual behavior and attitudes, and this is a phenomenon well worth deeper investigation.

New Channels of Therapy

New methods are developing rapidly in the field of psychotherapy, methods which appear quite different upon the surface, but which seem to have a fundamental aim which is similar to that of all psychotherapy. The development of narcotherapy during the war, most fully reported by Grinker,[38] in which drugs are used in an attempt to speed the initial and cathartic phase of therapy, is one such method. The use of hypnotherapy by a number of workers, notably, Lindner,[2] and Brenman and Gill,[36] is another such method. Basically psychoanalytic in approach, it is an attempt to increase the accessibility of the client, or to supple-

ment ordinary methods of analysis. The use of psycho-dramatic procedures, particularly by Moreno,[40] as a medium for cathartic release, for the gaining of insight, for the trying out of new behavioral roles, and for the development of spontaneity, represents still another channel by which therapeutic aims may be achieved.

The use of play techniques as a method of therapy deserves especial mention. It has a history extending over more than a score of years, and has been growing solidly as an alternative avenue of therapeutic expression for the child who would find it difficult to express his attitudes in words. Among recent writers in this field the names of Taft,[41] Allen,[17] D. Levy,[39] Conn,[37] Baruch,[35] and Axline[34, 42] are worthy of mention. All of these discuss play therapy techniques with children, but a certain amount of clinical experimentation has gone on in using such procedures with adults. This is a trend which is likely to develop, though we may be sure that a new name will be selected for the method when applied to adults. Although play therapy has been useful clinically, and is rapidly being extended in practice, it is a field in which little scientific research has been done, due in part to the difficulty of collecting the raw data in any objective form which can be analyzed.

The Extension of Therapy in Varied Fields

One of the outstanding trends of the past decade is the tendency for the methods and principles of psycho-therapy to be extended and applied in other fields. This is a direction which is likely to become more

marked. The concern of psychotherapy is the reduction of distressing tension in the individual, the alteration of attitudes and behavior in the direction of integration, and the development of responsible independence. Yet these same goals are important in many other fields, and as objective facts and presumably causal sequences are discovered in psychotherapeutic practice, it is only logical that these findings should be immediately seized upon and applied in a variety of situations.

One example may be found in the school. Teachers and educators are beginning to utilize therapeutic principles in education. Cantor's recent book[46] is an attempt to apply a partially client-centered approach to college classes, and his stenographic notes of classroom discussion indicate that the taking of personal responsibility may be as profound an experience in the classroom as it is in the therapist's office. Several projects are being carried on at the University of Chicago, applying more directly and more fully the principles of client-centered therapy to a teaching situation. As in Cantor's report, the results seem to be of a very different character than those obtained in most classroom situations, and the learning has a vitality and depth which cries out for objective analysis.

The use of play and group therapy techniques in nursery school education has been pioneered by Baruch,[43] and others. The utilization of release therapy with young children would appear to serve the function of improving socialization, family relationships, and personal integration. The use or adaptation of

therapeutic techniques by the classroom teacher may hold the eventual answer to the perennial aim of the school to aid in personality development as well as in accumulation of knowledge. A forthcoming book by Axline[12] is the first attempt to make directly available to teachers the basic therapeutic principles and techniques usable in the classroom. It is likely that it is only the forerunner of others in which the application of therapeutic procedures to the learning process at all academic levels will be set forth.

In industry as well as education we find psychotherapy making its contribution to the handling of human relationships. The pioneering work of Roethlisberger and Dickson[51] in Western Electric, inspired by Elton Mayo[50] is an outstanding instance of the cautious application of therapeutic principles, an application guided by research analysis which showed its effectiveness. A number of other industries are also making use of a therapeutic approach of a largely nondirective sort. Other therapeutic orientations have not made as much progress in industry, no doubt due in part to the fact that industry is often able to accept a counseling approach which leaves responsibility firmly with the client, while vaguely fearful of those procedures by which the therapist would to some degree assume the decision-making process for the client.

This extension of therapy to industry has, however, been slow and halting, primarily because it has been conceived of only as a means of assisting the worker at the bench. Only recently are management officials beginning to suspect that the application of therapeutic

principles to human relations might most effectively begin at the level of top management. Whether this will develop into a trend is at present uncertain.

It has also been true that up to this point industry has largely made use of counseling procedures only to increase the effectiveness of the individual worker. The possibilities inherent in group therapy for coping with interpersonal relations in a staff group, and for dealing with the emotionalized attitudes present in labor-management discussions, have as yet been little recognized by industrial leaders. With the social pressures which are being put upon both labor and management for improved methods of handling human relationships, one does not need a crystal ball to predict a trend toward wider utilization of therapeutic principles in many of these situations.

Religious workers are another group in which there is increasing recognition and use of psychotherapeutic principles and methods. Pastoral counseling is rapidly becoming an area of specialization in theological schools in which professional attitudes and training are taking the place of good intentions. In this as in other fields the influence of therapy does not stop with its effect upon religious counseling alone. A recent scholarly article by Hiltner[48] points up the fact that currently the most profound influences of psychology upon religious thinking are the influences of the differing therapeutic schools—Freudian, Jungian, nondirective, and the like.

A recent trend is also evident in vocational guidance work, a type of professional service which previously

has thought of itself as sharply differentiated from psychotherapy. Recent articles by Bixler[44] and Bordin,[45] reflect the way in which vocational advisers are re-thinking the use of tests and interviews in such a way as to make the vocational guidance contacts an experience in which the client can become aware of his emotionalized attitudes and deal with his own conflicts. While this therapeutic viewpoint is held at the present time by a very small minority in the vocational guidance group, it is likely, in the writer's opinion, to become a more significant trend in view of what seems to be an increasing dissatisfaction with the results of vocational guidance as traditionally carried on.

Trends in Professional Development in Psychotherapy

The outstanding change in the professional picture in the past decade is the emergence of the psychologist as therapist. Although it had appeared for a time that the clinical psychologist would never advance beyond the stage of a diagnostic technician, recent years have seen him become established in the therapeutic field in practice, in research, and theory. Even before the war such nonmedical therapists as Otto Rank[28] had long had significant influence, and the writings of Taft,[41] Roethlisberger and Dickson,[51] Baruch,[85, 48] and Rogers[24] had begun to make an impact. The wartime experience of psychologists working with psychiatrists in military situations added to the interest and skill of psychologists in therapy, though few of these men have as yet contributed much to the literature. The publica-

tion in recent years of books and articles by such psychologists as Brenman,[36] Combs,[19] Lindner,[2] Curran,[8] Muench,[10] and Snyder[7, 15] has added both to the general thinking in the field of psychotherapy and to research. To this list should perhaps be added the name of such a psychologically oriented sociologist as Cantor.[46, 47]

Psychologists have shown an awareness of their expanding function and their growing contribution in therapy, and have given official encouragement and sanction to the training of clinical psychologists in therapeutic principles and procedures. A "Proposed Program of Professional Training in Clinical Psychology" which was accepted by the American Association for Applied Psychology in September 1942[54] included courses, practicum experience, and internship experience in therapy. A more recent committee report on "Graduate Internship in Psychology"[52] stresses similarly the necessity of preparation in therapeutic theory and methods, and the practice under supervision of these procedures.

It is an important professional fact that this development of the clinical psychologist as therapist has gone forward with the approval, even though at times an ambivalent approval, of the psychiatric profession. The training of clinical psychologists for the Veterans Administration, as approved by the medical officers, specifies that these men shall be trained in therapy.[53] The joint committee of the American Psychological Association and the American Psychiatric Association gives a very guarded, cautious, and somewhat ambi-

guous approval to the practice of psychotherapy by both psychiatrists and clinical psychologists, "according to their competences acquired through training."[55] There seems to be a definite decrease in the number of psychiatrists who desire to bar the psychologist from the field of therapy.

Of even deeper significance is the willingness of both psychiatrists and psychologists to face the perplexing issues involved in this overlapping of professional functions. The joint committee mentioned above is one such evidence at the official level. Another is the recent meeting of child guidance clinic staff members at Cincinnati, where the relationship of the professions was frankly discussed. It is reported that there was rather general agreement that although social work, psychiatry and psychology each might be said to have somewhat distinctive functions in diagnosis, the same could not be said for therapy. In treatment each functioned as a therapist, and no distinction could be made on professional grounds.

In this connection it is well to note one area in which trends are conflicting. As psychiatrists and psychologists endeavor to work out co-operative relationships in therapy, there is a renewed verbal stress on the "team approach" of the professions to clinical work. This was evident in the military service and is heavily stressed by the Mental Hygiene Units of the Veterans Administration. Yet the experience of the child guidance field, which advocated the "team approach" twenty years ago, indicates that it is not the answer, and is almost certain to be left behind. Few if any first-rate child

guidance clinics any longer make use of the "team approach" in therapy. There are, of course, educational and possibly political advantages to· be gained from having three professions associated closely together, but as a means of treatment, the attack of a three-fold team upon the problems of one client is outmoded. The situation may be stated briefly as follows. Mental hygiene clinics are putting more stress upon therapy, less upon diagnosis. The "team approach" may have some validity in diagnosis, but therapy, whatever its orientation, tends to stress increasingly the relationship between two people, the client and the therapist. Hence the "team approach" is almost certain, in spite of verbal protestations to the contrary, to play a smaller and smaller part in clinical practice. Increasingly members of the three professional groups are likely to function as individual therapists.

One final question remains in regard to the trends of professional development in psychotherapy. Will the psychologist practice psychotherapy entirely within the medical framework, or will he carry on his therapeutic work independently as well? Examination of current developments brings the writer to the second conclusion. The growing number of nonmedical student counseling services, the increasing definition of student counseling in terms synonymous with therapy, the training of several hundred doctoral candidates in psychology in the methods of psychotherapy, the establishment of such programs as the Personal Counselor program in the Veterans Administration,[56] the increasing leadership of psychologists in research in

therapy, seem to point to but one conclusion; that psychologists are, and increasingly will be, practicing psychotherapy outside of, as well as inside, the medical framework. This is a sobering conclusion, since it is a grave question whether psychology is as yet prepared to cope with the problems of responsibility which are involved. The fact of increasing co-operation with the medical profession may supply a part of the answer, helping to define the limits of therapy as carried on by psychologists, and opening and maintaining the channels of referral. At any rate this trend toward independent functioning would seem to constitute a challenge to psychology which must be met wisely and promptly.

The Effect of Psychotherapeutic Trends Upon Psychology

In concluding this survey we may well inquire as to the influence which these trends in psychotherapy may have upon the main stream of psychological thinking. It is likely that this influence will be considerable. Among young psychologists newly completing their training it is probable that psychotherapy would rank near the top of the list so far as interest is concerned. This means that inevitably their experience with therapy will feed into other areas of psychological thought.

If we may try to estimate these future trends, it is probable that it will mean a greater stress upon holistic concepts in all of psychology. Experience with the individual as a total and organized unity in psychotherapy will almost inevitably lead to hypotheses in

other fields of psychology which spring basically from holistic rather than atomistic ways of thought. It also appears likely that there will be incorporated into psychology an interest in the alterability of psychological attributes, as well as the fixity of such characteristics. Up to this point the preponderant emphasis has been upon the latter. Still another influence upon the general stream of psychology will result from the opportunity to re-examine in the new frame of reference supplied by recordings of individual and group therapy, many of the basic problems of psychology, such as motivation, learning, and perception, to mention a few. This is likely to lead to experimental clinical research of significance to all of psychology.

Our examination of the trends in psychotherapy would lead to the conclusion that here is a vital and dynamic field of psychology, which is just beginning to emerge from a prescientific into a scientific stage. In it we find controversies and contradictions which only research can settle, but evident also are significant and growing areas of agreement in clinical experience. The development of many different channels and media of therapy appears to offer opportunity of testing research conclusions in a variety of ways. The significance of the field of psychotherapy for society is indicated by the way in which both clinical and research findings find their way into functional usefulness in such diverse fields as education, industry, and religious work. There would seem to be evidence that the psychologist is rapidly forging ahead in this new professional realm and taking increased responsibility.

The likelihood is suggested that the intimate association of the psychologist with the dynamic forces of individual adjustment revealed through therapy will have a decided influence upon the whole course of psychological research and theory.

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PERSONNEL PSYCHOLOGY

John C. Flanagan

THE term "personnel psychology" is not discussed
or defined in current psychological dictionaries
or textbooks and, therefore, it especially needs to be
defined at the outset of this discussion. The simplest
definition of personnel psychology is that it is the
application of psychological principles and the scien-
tific method to personnel problems. Personnel prob-
lems are considered to include those of individual
guidance, selection and classification, training and edu-
cation, the measurement of proficiency, the evaluation
of individual effectiveness in a specific activity, opera-
tional procedures and equipment, and effective group
action. It will be observed that personnel psychology
overlaps, to some extent, other fields of psychology.
Such overlapping appears desirable. It is contended
that the *problems* should determine the content of
the field and that any splitting up of the topic to reduce
overlapping will hamper efforts toward the solution
of these problems.

The beginnings of personnel psychology are to be
found in the work of Francis Galton, whose keen mind
outlined investigations for many problems regarding
the practical activities of people. His "Studies of Types
of Character" published in *Nature* in 1877, and his
paper on "The Measurement of Character" in the *Fort-
nightly Review* in 1884 provided a sound plan for

developmental work in this field. However, progress during the fifty years following his initial studies was slow. Several lines of development emerged gradually. It is interesting to note that the current textbooks and historical reviews in each of these various areas, with striking unanimity, trace their lines of development back to Galton's work.

Early Developments

To provide the setting for discussing the modern developments in these fields, a few of the outstanding contributions in each of six contributing areas of specialization during the fifty years from 1877 to 1927 will be traced. The six areas are mental tests, statistics, industrial psychology and personnel management, educational psychology, personality and character, and social psychology and group action.

One of the main lines of development in the field of *mental tests* is traceable through the work of J. McKeen Cattell, Edward L. Thorndike, Charles E. Spearman, Truman L. Kelley, and Walter R. Miles. The work of these men and others provided the basis for the measurement of a variety of mental traits, including special aptitudes. It centered around Columbia University in this country and the University of London in England.

One approach which rendered a valuable service in providing practical tools for psychologists during this period, but which seems to have resulted in a detour from the main line of development, is represented by the individual tests of intelligence developed by Alfred

Binet and Theophile Simon in France. These pro-
cedures were contributed to especially by Lewis M.
Terman, who developed the Stanford-Binet tests of
intelligence for use in this country. A similar develop-
ment was the group intelligence test, which was espe-
cially contributed to by Edward L. Thorndike and
Arthur S. Otis. These intelligence tests were given a
special impetus by their wide use during the first
World War. They were used very extensively during
the years that followed. Only in recent years has the
development of other types of aptitude tests begun
to catch up with the work in this area and place intel-
ligence tests in their proper position. There is still
considerable overemphasis of the type of scholastic
aptitude represented by the usual tests for general
intelligence, as compared with other equally impor-
tant aptitudes.

A second primary line of development was the work
in *statistical theory,* which can be traced through the
fundamental contributions of Karl Pearson, Charles E.
Spearman, Truman L. Kelley, Godfrey Thompson,
and L. L. Thurstone. The development of the funda-
mental methods of measuring relationship, repre-
sented by the Pearson product-moment correlation
coefficient and other related measures, provided the
fundamental tool on which the greater part of modern
research in this area is based. Virtually all scientific
prediction involving human behavior is based on these
methods of correlation and multiple correlation.

The primary contribution of the other men men-
tioned was to develop procedures for analyzing sets of

correlation coefficients so as to obtain new insights into the relationships of the variables involved. These procedures are now commonly referred to under the title of "factor analysis."

During these fifty years there were many other developments in the field of statistical theory, but those mentioned were of most importance to the development of personnel psychology.

A very important line of development during this early period is represented by the broad field included under the general titles of *industrial psychology* and *personnel management*. Pioneer work in this area was done by F. W. Taylor, who developed what he called "scientific management procedures." Walter D. Scott also made important early contributions along this line. One of the earliest formal organizations in this field was the Division of Applied Psychology at the Carnegie Institute of Technology in Pittsburgh. This was established under the direction of Dr. W. V. Bingham in 1915 and included on its staff a number of individuals who made important contributions to this field. During this period, Hugo Munsterberg, at Harvard, made important contributions to this work, as did also Daniel Starch, E. K. Strong, and others. The Psychological Corporation, which was organized in 1921 by Cattell, Thorndike, and others, began its work during this period, and the National Institute of Industrial Psychology of the United Kingdom was established under the direction of Dr. C. S. Myers.

The work of those years in industrial psychology and personnel management was primarily responsible

for the development of personnel departments in a very substantial number of the large commercial and industrial organizations. Although psychologists contributed most of the basic principles of personnel management, relatively few psychologists—and an even smaller number of research psychologists—were actively engaged in personnel work.

Another important contributory development was the work in *educational psychology*. Edward L. Thorndike and Arthur I. Gates at Columbia University and Charles H. Judd at the University of Chicago were important influences in the application of psychology to educational problems. During the latter part of the period, W. W. Charters made important contributions to this field, especially along the lines of activity analysis procedures.

One of the main lines of development within this field is represented by the work on educational achievement tests. In addition to those mentioned, Stuart Courtis, V. A. C. Henmon, G. M. Ruch, Truman L. Kelley, Lewis M. Terman and Ben D. Wood made important contributions to the development of objective and reliable measures of certain of the outcomes of education.

One of the fields in which Francis Galton took the greatest interest was *personality and character*. However, progress on the development of the measures of human nature which he advocated was very slow. The problems of personality, character, and temperament appear to have stayed in the hands of philosophers longer than most of the other fields previously dis-

cussed. Much of the early work was speculative rather than experimental.

Among the names prominently associated with this early work were William McDougall, Ernst Kretschmer, and Eduard Spranger. Both Kretschmer and Spranger developed detailed descriptions of "types." The constitutional typology of Kretschmer assumed that the structural and chemical constitution of an individual determined his personality, susceptibility to diseases, etc. In Spranger's view the type of value which the individual accepts as dominant for him shapes his personality.

Another line of development is represented by Sigmund Freud, Alfred Adler, and C. G. Jung. These medical practitioners approached the problem through the clinical study of individual cases; their conclusions have had strong influence on work in this field.

Toward the end of the period a trend toward more experimental work was noticeable. One of the major projects was the study of character made under the direction of Mark A. May. Experimental work was also done by R. S. Woodworth, F. H. and G. W. Allport, and H. A. Murray. However, as previously noted, the influence of the objective methods of natural science and statistics was not noticeable to any large extent in most of the work on personality and character.

Another field which remained largely in the philosophical and speculative stage is that represented by *social psychology,* including problems of group action. William McDougall, and during the latter part of the period, F. H. and G. W. Allport and Gardner and Lois

B. Murphy, contributed to the development of a general framework for studying and interpreting group action. However, here again a large proportion of the contributions were not experimental in nature.

Trends in the Past Twenty Years

In addition to this general review of early developments in these various fields, a more precise study has been made of work of the past twenty years. The first phase of this study consisted in tabulating the number of articles included in *Psychological Abstracts* dealing with each of these types of problems. Table 1 gives the number and per cent of articles of each of these six types for each of the twenty years.

To facilitate the study of these figures, a series of summary charts has been prepared showing the trends for each of the six areas and the combined group. Each bar in the upper left chart in Figure 1 represents the average percentage of all the articles included in *Psychological Abstracts* which were on *mental tests* during a four year period. A similar trend for *statistical theory and techniques* is shown in the chart next to this. The remaining charts illustrate the trends for *industrial psychology and personnel work, educational psychology, personality and character,* and the field of *general social process or social function.* In none of these figures is any very marked trend evident. There has been a slight tendency for the proportion of articles on mental tests and social psychology to decrease, and for the proportion on personality and character to increase. During the war there was a significant in-
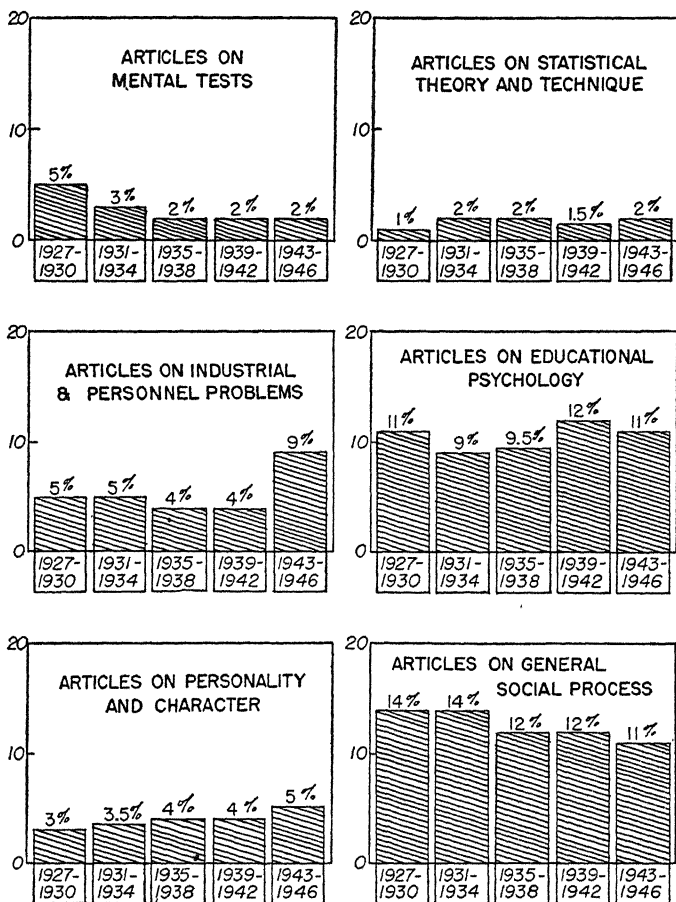
Figure 1

PER CENT OF ARTICLES APPEARING IN PSYCHOLOGICAL
ABSTRACTS BY FOUR YEAR PERIODS 1927-46

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crease in the proportion of articles regarding industrial and personnel problems.

Figure 2 shows the trend with respect to the proportion of all articles abstracted represented by these six fields. It will be observed that during each of the five

TABLE 1

NUMBER OF ARTICLES APPEARING IN
PSYCHOLOGICAL ABSTRACTS IN EACH OF SIX FIELDS

1927–1946

Year	Personality and Character	Social Functions	Industrial and Personnel	Educational Psychology	Statistical Theory and Techniques	Mental Tests	Total for Year
1927	72	266	150	251	33	103	2730
1928	106	466	179	393	48	176	3758
1929	182	832	247	599	85	181	5016
1930	173	868	333	704	74	282	5139
1931	163	866	244	445	109	163	5066
1932	179	665	274	388	92	137	5088
1933	191	797	247	545	119	187	6129
1934	224	780	344	527	99	149	6184
1935	238	810	262	527	93	135	6056
1936	226	697	259	530	128	134	6062
1937	269	670	269	717	125	94	6063
1938	252	852	267	558	106	84	6693
1939	228	743	217	555	63	120	6557
1940	235	881	313	852	92	118	6275
1941	352	545	164	701	70	83	5452
1942	220	592	290	658	134	94	5066
1943	152	473	314	501	136	59	4323
1944	146	456	360	511	47	52	3926
1945	189	402	317	350	57	62	3539
1946	279	446	593	405	98	136	4936

PERSONNEL PSYCHOLOGY

TABLE 1 (continued)

PER CENT OF TOTAL NUMBER OF
ARTICLES REPRESENTED BY THE SIX FIELDS

1927	3	10	5	9	1	4
1928	3	12	5	10	1	5
1929	4	17	5	12	2	4
1930	3	17	6	14	1	5
1931	3	17	5	9	2	3
1932	4	13	5	8	2	3
1933	3	13	4	9	2	3
1934	4	13	6	9	2	2
1935	4	13	4	9	2	2
1936	4	11	4	9	2	2
1937	4	11	4	12	2	2
1938	4	13	4	8	2	1
1939	3	11	3	8	1	2
1940	4	14	5	14	1	2
1941	6	10	3	13	1	2
1942	4	12	6	13	3	2
1943	4	11	7	12	3	1
1944	4	12	9	13	1	1
1945	5	13	9	10	2	2
1946	6	9	12	8	2	3

periods slightly more than one-third of the articles abstracted were included in one of these six fields.

Although no special trends are to be found in the relative amount of published work contributed by these areas during the past twenty years, the nature of the articles published within some of these fields has changed in certain respects.

By tabulating the listings in the subject indexes of *Psychological Abstracts* for guidance, aptitudes, and factor analysis for each of the twenty years, and com-

bining into four year periods as before the results shown in Figure 3 are obtained. Here we do have apparent upward trends over this period, although, in
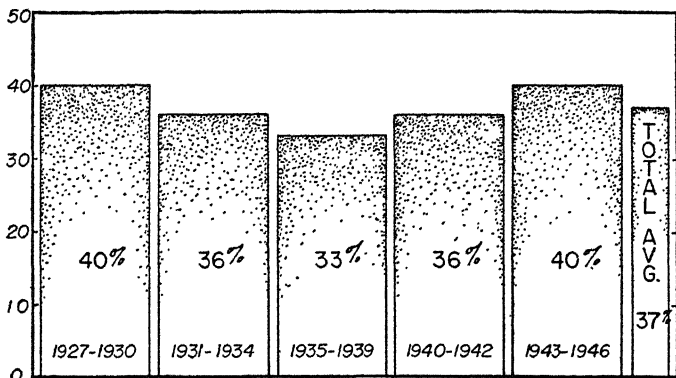

Figure 2

TOTAL PER CENT OF ARTICLES IN ALL SIX FIELDS
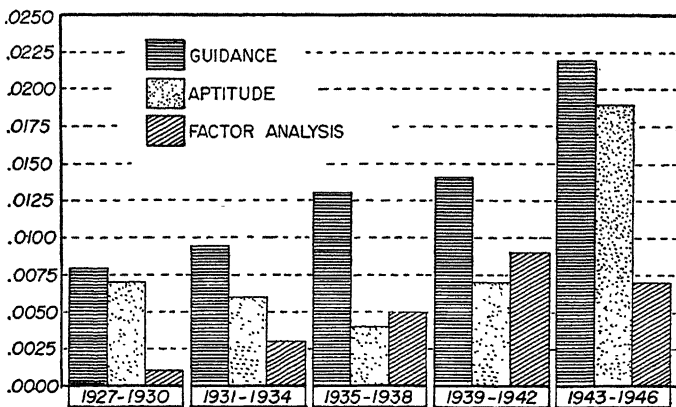FOR FOUR YEAR PERIODS 1927-1946

Figure 3

PER CENT OF TOTAL ARTICLES GUIDANCE, APTITUDE, AND
FACTOR ANALYSIS FOR FOUR YEAR PERIODS 1927-1946

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general, the numbers and percentages are not large, even for the last four year period.

In summary, it may be said that although some change of emphasis is occurring in the work done in various fields, the evidence from the analysis of articles in *Psychological Abstracts* does not indicate a strong and sustained trend of expansion in any of the areas which have been the principal sources of the principles and procedures which provide the basis for personnel psychology. In spite of these findings, it is believed that a period of rapid development in this field is at hand. This belief is based primarily on the large amount of research done in this field in the military services, most of which has not yet been published. Because much of this work was co-operatively planned and co-ordinated, large-scale studies were possible. These resulted in important progress being made, especially with regard to techniques. Another important factor is the large number of research psychologists who have developed skills and interests with regard to personnel problems.

A Twenty Year Program

In defining current trends in personnel psychology and suggesting a program for this field, greatest emphasis is placed on the developments during the war in the military services. The twenty year program for personnel psychology outlined here is believed to be an important national need at the present time; and it is hoped that psychologists and administrators will co-operate effectively in seeing that it is carried out.

Although personnel psychology is not necessarily tied to any one set of beliefs or philosophy, for planning purposes certain assumptions have been used which it is believed are generally accepted by people in this country.

The first of these broad principles is that individuals regard themselves as primarily members of the social group and, therefore, the basis for determining individual rights, privileges, and obligations must be the will of the majority (that is, democracy). It is clear that groups acting in the past on the basis of the will of the majority have not always made decisions in their own best interests. This has sometimes led to very serious consequences for the members of such groups, and the value of this form of social rule has been questioned by many. For groups to function satisfactorily under democratic rule it is essential that effective methods be developed of collecting and disseminating information and of making sound decisions. Basically, this appears to depend on the education of the individuals in the group regarding the problems of group management.

The second fundamental principle is that the principal objective of the social group is the welfare and greatest possible development of each individual. The ultimate aim of the individual in making his contribution to the group is to create the largest number, the highest quality, and the longest lasting satisfactions for individuals in the group. This belief contrasts with those which make the welfare of the group the primary goal and disregard the individual except in his role as a member of the group. Satisfactions to the

man as an individual are regarded as unimportant in these opposing views, unless they contribute to his efficiency in performing functions for the group.

In the views expressed here the goal is taken to be individual satisfactions rather than group efficiency. It is necessary for the group to produce goods for its members, distribute them, and protect the group from all types of dangers. However, these are merely means of assisting the individual; and, in all planning, the development of the individual and the increasing of his satisfactions are the controlling ideas.

The third and final basic principle is that by using the scientific method it is possible to discover natural laws regarding the potentialities of individuals and to discover the principles of educating and organizing groups to achieve the fullest realization of these potentialities. Although the scientific method has great prestige in psychological and educational groups, there has not been any large systematic attack on these problems using this approach.

Critical Requirements

The first of the fundamental projects around which this program is based is the development of a comprehensive list of the critical requirements for success in all of the important activities in which human beings engage. What appears to be needed is not a long list of all of the traits which might possibly facilitate successful participation in a particular activity, but a brief, well-defined list including only those traits which in a significant number of instances have been

found to have made the difference between success and failure in the activity. These are the crucial traits and are defined as the critical requirements for the particular activity. Critical requirements must be determined for all types of activities: vocational, recreational, civic, and social. Such information is essential for all fundamental research in personnel psychology.

Activity analysis is not new and some type of activity analysis has been a prerequisite to all experimental work in this field. However, in the early days the experimenter merely sat and reflected on the problems that might confront the participant and made up his hypotheses on this basis. The next step involved a great deal more activity on the part of the experimenter. He participated in, observed, and inquired about the activity. The most recent emphasis is on increasing the extent of systematic observation and especially concentrating on reasons for failure in various specific parts of the activity. The data obtained are more objective and more specific, and tend to define the precise ways in which individuals fail in the activity.

Although much progress has been made with respect to techniques for obtaining such critical requirements, additional experience in this field will undoubtedly result in substantial improvements in the procedures thus far developed. The first step in studies of this type is the systematic tabulation of the critical requirements in terms of actual behavior in the activity. The second step is to translate these critical requirements, which are originally stated in terms of behavior, into hypotheses regarding the specific aptitudes, habits,

skills, attitudes, personality and temperament traits which resulted in the observed failures. This phase of the study appears to depend primarily on the judgment, experience, and insight of the research worker. Maturity and wisdom seem to be essential, and academic training and effort cannot profitably be substituted for it. Improving the skill in using technical procedures, increasing the extent of observation, and extending the period of study will be found to be less rewarding with respect to this phase of the work than for any other.

The ultimate goal of this study of critical requirements is to improve the techniques of observation of behavior and the insight and judgment with which these observations are translated into selection and training requirements to such an extent that the hypotheses regarding the requirements, in terms of personal traits and training, are almost invariably confirmed by later study. From the point of view of practical information, this part of the program would aim to provide a comprehensive and continuously brought up-to-date list of the critical requirements for all important life activities.

Guidance Procedure

The development of hypotheses regarding the nature of the requirements for successful participation in a specific activity leads immediately to the need for the development of tests of aptitudes, attitudes, and personality traits. The work during the first World War clearly established the fact that large individual

differences with respect to general ability exist. One of the important contributions of psychological research during the war just ended was the demonstration of the extent of specificity in the requirements for success in various types of important tasks. A corollary finding was the large number of important independent traits which are necessary to describe individuals.

Recent findings indicate that not only do individuals differ widely, but they also differ in very many important respects; and these differences tend to persist in spite of efforts to achieve uniformity during prolonged periods of training and participation in various activities. Through statistical procedures of analyzing correlations, trait theory has changed in the past twenty years from a widely accepted belief in a relatively small number of dimensions of mind, with one of them (usually called general intelligence) playing a very dominant role, to a belief that many relatively independent and approximately equally important traits are required for individual description and prediction.

Factor analysis procedures have been developed in an effort to learn more about the nature of psychological traits and also to facilitate the use and interpretation of trait differences. Although, during the recent developmental period there has been much misuse of these procedures, a substantial amount of technical experience has been gained and more expert application of these techniques can be anticipated as there is an increasing awareness of the nature and limitations of available methods.

From a practical point of view the most important advance during the next twenty years can be expected to be the development of a comprehensive test battery including approximately 50 independent tests. This battery of tests will include 10 or 15 tests in each of the four general fields following:

1. *Learning and thinking.*

This area, it is intended, will include all mental processes dealing with abstract ideas. It will include such psychological traits as memory, judgment, fluency, and foresight.

2. *Observation and visualization.*

This category includes processes involving concrete things rather than ideas. Tests will be developed measuring ability to locate points and objects with or without a reference system, ability to visualize objects in two- and three-dimensional space, and ability to identify and compare objects.

3. *Sensori-motor co-ordination.*

The processes in this group involve purposive movement of objects. Tests will be developed measuring finger dexterity, pressure control, speed of large muscle movement, and accuracy of large muscle movement.

4. *Motives and temperament.*

This category includes the basic reasons for doing things and the typical manner in which they are done. Tests will be developed to measure character, values, fundamental interests, fixed habits, and characteristic modes of response.

In developing this battery of about 50 independent tests, certain general principles based on recent experience will be useful. The first of these principles is that it is desirable to develop aptitude tests, each of which measures a single psychological function operating at the maximum level which the individual is capable of attaining. Since there is some learning resulting from practice for most functions, such tests will have obvious advantages in stability of relative performance.

The next principle, which is closely related to the first one, is that the content of tests should be based on materials which have been learned by individuals through common experiences over a long time.

Another closely related principle is that it is desirable to measure functions for which the learning curves tend to be relatively flat.

Another important principle is that the "sets," including method of approach and attitudes of the various individuals toward the tasks assigned in the test, should be as uniform as possible. Comparable measures cannot be obtained if various individuals set themselves different tasks, the nature of which is unknown to the observer. For this reason, the observation of uncontrolled behavior was found to have little predictive value in the situations studied.

These points suggest the inadequacy of questionnaires and inventories of interests and adjustment, typical of those in common use at present. Two approaches to the problem of measuring such functions which have been recently found to be promising are based on the view that an inventory of what a person

has done in the past is one of the best bases for predicting what he will do in the future. By asking for objective information regarding details of the individual's history and using items, in so far as possible, which can be verified from records concerning the individual which are known to exist—even though they are relatively inaccessible—a fairly satisfactory prediction of adjustment to many future situations can be made. The second procedure is to sample the types of information which the individual has accumulated over a long period of time as a result of voluntary participation in activities or as a result of special interest in and attention to certain types of activities. This approach seems to provide more valid predictions of adjustments.

One other important point with respect to the development of such a battery of tests for use in individual guidance is that most studies in the past have been based on very inadequate samples. Approximately 1,600 individuals should be included in any correlational study, the results of which are expected to lead to definite use of certain of the measures for guidance purposes. If the correlations are likely to be high (above .70), a sample of 400 cases will provide useful results. On the other hand, in some situations, especially when the criterion contains a large proportion of chance factors, several thousand cases are very desirable.

Education and Training

Just as the findings regarding the important requirements for successful participation in various activities lead to hypotheses regarding necessary aptitude and

temperament qualifications, they also lead to hypotheses regarding necessary training. Experience in the military situation suggests that more educational programs will be found to be inadequate because the wrong things are included in them than because the techniques of instruction are defective.

The first step in this phase of the program will be to prepare a comprehensive and detailed list of educational objectives based on the tentative findings with respect to activity requirements. After this has been done, plans for educational courses should be developed. These plans should be checked carefully with respect to conformity to known facts regarding the nature of the learning process. It is frequently found that in the enthusiasm to apply *one* of the basic principles of learning, others are forgotten.

Certain points deserve special discussion here. One is with respect to special devices and equipment. Many skills cannot be learned by just reading about them. Actual manipulation of the equipment is necessary. In providing such equipment, great care must be taken to insure that the task on which training is obtained is identical in all essential respects with the actual device to be used. Even a very slight change may nullify the whole training program or even make it more difficult to operate the device effectively than if no training at all had been received.

Motion pictures can be used with substantial improvement in learning and retention for some types of training. However, the general principles of learning discussed above apply. Motion pictures have been

shown to make a unique contribution when the situation involves movement and serial action and these findings should be studied before plans for using this learning aid are developed.

One of the most important points to be checked concerns provisions for maintenance of proficiency. Frequently, educational programs develop a high degree of ability with respect to a specific activity early in the course, without any provision for maintaining this skill until time for it to be used.

The problem of the selection and development of teachers is important. However, recent experience suggests that if the courses are properly developed and the teachers are supplied with adequate assistance, teachers of the present quality can be expected to achieve excellent results.

It is concluded that the most profitable approach to problems of training is through a reappraisal and revision of educational objectives based on a systematic survey of critical requirements. The numerous hypotheses developed at this stage will then be tested by established techniques of educational experimentation.

Evaluation of Proficiency

This immediately raises the general question of the evaluation of the results of education and training. This evaluation is an integral part of any sound educational program. Ordinarily in the schools it is not practical to train for a particular activity and then obtain an immediate evaluation of effectiveness in actual participation in this activity. Therefore, it is usually

necessary to develop procedures for evaluating the results which are practical and, at the same time, as nearly like the defined objectives in terms of the real activity as possible.

The most frequent error in developing procedures for measuring proficiency has been to include only those objectives of the course which could be easily sampled, such as the extent to which certain information has been learned and retained. It is proposed that hypotheses be formulated regarding the appropriate types of procedures for evaluating the effectiveness of the educational program. As in other instances, these hypotheses would be based on the tentatively defined requirements for effective participation in the activity.

There is much developmental work to be done in devising new types of procedures for measuring the results of training. This need is especially great with respect to complex skills, habits, attitudes, and personal adjustment. Recent experience indicates that the most useful procedures in this field will be objective—that is, the resulting scores will not be appreciably influenced by the subjective judgment of the particular examiner, nor will they be affected by variations in the students' interpretations of the nature of the tasks which they are assigned.

Much experience was gained during the war in developing measures of various types of proficiency, attitude, and personal adjustment; and it is believed that substantial improvements may be expected in the nature of the procedures used for the measurement of educational outcomes.

Criteria of Effectiveness

The final link in the chain of prediction must always be effectiveness in actual participation in the specific activity. Although it would be inefficient and impractical to make all comparisons in research on training and guidance problems with this ultimate criterion measure, experience clearly demonstrates that ignoring this step may lead to serious errors. It is therefore proposed that a systematic program of comparing proficiency measures with criteria of successful participation in the activity itself be inaugurated. It would be inefficient to attempt this with current measures of proficiency, since it is believed that very few of them would appear acceptable when evaluated, even on the basis of a brief survey of critical requirements. All new procedures, however, should be studied carefully. It should also be emphasized that this evaluation must be a continuous process. As requirements change, the test battery, educational procedures, and proficiency measures will also have to be modified; and these revisions will, in turn, have to be compared with appropriate criteria.

The criteria of effective participation in an activity can definitely be regarded as of any given time as the last and final authority in research in personnel psychology. Experience also shows that they are almost inextricably tied up with the first step, that of obtaining critical requirements. It is impossible to study the requirements for success in an activity without defining the activity. A complete definition of what is meant

by success in the activity is practically identical with a statement of the procedure for obtaining a criterion.

A fact which has been inadequately realized by research personnel in the field is that there is no way in which criteria of success can be established on an empirical basis. The definition of success in any activity must always be based on rational considerations. It is impossible to avoid making judgments regarding the relative importance of various aspects of the assigned task. In some instances experts can quickly come to an agreement with respect to the relative importance of the parts of a task. For example, experts would probably have little difficulty in agreeing as to the relative weights to be given number of errors and number of words typed per day in establishing a criterion of routine typing competency. However, it would be very much more difficult to get agreement on the relative weights to be given available criteria in evaluating the success of a railroad engineer. Great disagreement could probably be anticipated with respect to the weight that should be given to per cent of runs made on time as compared with number of violations of regulations regarding speed and signal lights. But recommendations regarding selection procedures for engineers cannot be made without answering that question.

In approaching the problem of obtaining a final criterion measure of success for an activity, the first problem is, "what types of measures are available or can be obtained?" The types of measures of the effectiveness of the individual can be conveniently classified into (1) objective records and (2) ratings. Objective

records are usually much preferred. In most instances, usable records are not available and it is necessary to obtain them.

Ratings based on general impressions are usually of little value. These records have been found to be spuriously related to length of acquaintanceship and rank or prestige. Furthermore, very few raters can analyze and remember their observations well enough to differentiate between various aspects of the individual's behavior. The result is an inevitable blurring which tends to make the rater ascribe the same level of effectiveness on all traits that he has observed with respect to one particular trait which came to his attention. Although ratings have many shortcomings at best, in cases where they are used it is very desirable that they be based on direct systematic observation. The value of this type of data can be increased by careful definition in advance of the specific aspects of behavior to be observed and rated.

The final selection and weighting of the measures to be used in obtaining the criterion score is based on three principal considerations. These are relevance, reliability, and freedom from bias. As previously mentioned, relevance is fundamentally a matter of judgment. Intercorrelations and other types of empirical data should be gathered to improve the degree of insight into the situation as much as possible.

The more relevant the criterion the less reliable, in the technical sense of freedom from attenuating factors, it is likely to become. For example, the number of enemy planes shot down is a very relevant criterion for

evaluating the effectiveness of a fighter pilot, but differences in the quality of enemy opposition, opportunities for aerial combat, and many similar factors greatly reduce the reliability of this measure as a criterion of success. Biasing factors are extraneous factors similar in nature to attenuating factors. However, biasing factors, rather than regressing the obtained correlation toward zero as do attenuating factors, may increase or decrease it.

In an effort to improve the generality of the judgments regarding the definition of the criterion, several judges are sometimes used, rather than a single judge.

It is of great importance that the research worker report as clearly and completely as possible the definition of the criterion which is finally selected. Serious errors have occurred because of the failure of the research worker to make clear to others the nature and limitations of the criterion used.

Equipment and Operating Procedures

Several other things besides analyzing and guiding individuals and giving them the most appropriate education and training affect their results. Both the nature of the equipment used and the way in which it is used are of great importance. Although this problem will not be discussed at length here, it is noted that personnel psychologists have a responsibility to see that individuals are called on to do things which they can do easily and effectively in so far as this is possible. In many instances neglect of psychological principles and absence of empirical data have caused equipment to

be very difficult to operate when it could just as well have been very easy. This observation should not be confined to mechanical equipment, but includes all types of forms and routines which people are required to execute in an awkward and unnatural manner. It is certainly essential that any program dealing with personnel develop procedures not only for the personnel but also simplify the tasks they are called upon to perform, so as to obtain maximum effectiveness in terms of psychological principles.

Effective Group Action

Another factor has an important bearing on an individual's effectiveness in many situations. This factor relates to the other members of the group with whom he is associated. Individuals are social beings and their reactions to those around them have a large influence on their effectiveness in the specific situation. No program of personnel psychology can afford to ignore this basic problem.

The present program proposes two major projects aimed at increasing the effectiveness of group action. The first is an intensive study of the problems of leadership. This problem has already received some attention, but a much more thorough and comprehensive study is essential. The techniques for this study will be the same as those for studying any other specific activity, as described previously in this paper. All evidence suggests that an improvement in leaders can have a greater influence on the effectiveness of the individuals under them than any other single change.

The second proposed approach to improving group action is through the development of very simple procedures for analyzing and labeling the bases for individual decisions and actions. It is hypothesized that the bases on which most decisions and actions, both trivial and important, are now made would result in considerable embarrassment to those concerned if they were viewed from an entirely objective and detached point of view. This would be especially true if a few "horrible examples" of the results of such actions were kept before people's minds. The objective of the procedure would be increasing the intelligence of group actions by pointing out the consequences of individuals basing decisions on bases which seemed to satisfy an immediate need for them but were basically unsound from both a personal and social point of view over a long period.

The method of this study would be to make a survey of decisions in many types of situations and develop a list of bases for decisions, such as jealousy, personal ambition, personal convenience, personal friendship, vindictiveness, self-protection, and ego-satisfaction. The proportion of times these motives predominated rather than intelligent ones could be presented graphically with illustrations and definitions. It is believed that self-respect and social pressure, as well as enlightened self-interest, would be very effective in increasing the proportion of intelligent decisions.

The basic guiding principles and objectives outlined at the beginning of this discussion of a twenty year program for personnel psychology demand a real

improvement in the quality of leadership of all types of groups, and a substantial amount of improvement in the quality of decisions made by individuals. This proposal is not an attempt to "change human nature," but rather an attempt to assist the individual in his decisions by giving him a convenient means of identifying and labeling the bases for both his own decisions and those of others.

Conclusion

In conclusion, personnel psychology consists in the application of psychological principles and the scientific method to personnel problems. Its beginnings can be traced to the work of Francis Galton approximately seventy years ago. During the fifty years which followed, important contributions, chiefly in the form of basic research techniques, were developed in this country and in England. No very conspicuous and sustained trends are evident from an analysis of various types of articles included in *Psychological Abstracts* for the past twenty years, but it is suggested that strong influences were built up in the military services which can be expected to result in a period of rapid development for personnel psychology in the next few years.

A series of basic projects in this field is presented in the form of a twenty year program for personnel psychology. The major projects include: (1) the development of a comprehensive list of the critical requirements for all activities; (2) the development of a guidance battery of approximately 50 independent tests; (3) the development of a comprehensive list of

educational objectives; (4) the development of new and comprehensive procedures for evaluating proficiency with respect to the objectives established by the requirements as defined; (5) a systematic program of validating the first forms of the materials mentioned in (1), (2), (3), and (4) above, using carefully developed criteria of success (this would also include plans for the continuous testing and revision of procedures of all types to make further refinements and to take account of changes in activities, equipment, and procedures); (6) a simplification of the tasks individuals are called on to perform, in terms of the psychological principles for obtaining maximum effectiveness; (7) the development of improved procedures for the selection and training of leaders; and (8) the development of materials which would assist the individual in making more intelligent decisions regarding matters of group action.

It is believed that the successful completion of the program outlined above will represent an important milestone in the effort to apply scientific methods and psychological principles to the problems of developing the nation's most valuable resources, the talents and potentialities of its citizens.

HUMAN ENGINEERING

Clifford T. Morgan

THE papers of this conference point up many current trends in psychology. Biggest of them all is that in the past thirty years psychology has shortened its hair, left its alleged ivory tower, and gone to work.

Psychology is no longer satisfied to be idle in its den. Today we see psychology applied in schools, governments, clinics, armies, movies, factories, hospitals, in winning friends, in living with wives, in selling soup. From this trend we may predict that in years to come— not too many years—psychology will take its place among those basic sciences in which purity and usefulness already work hand in hand. Psychology and its technology will be in fairly good company if it follows along after—or maybe even leads—such double-barreled disciplines as physics and engineering, or biology and medicine.

And along with its tendency to go to work there is another important and healthy trend. *Pure, fundamental,* and *applied* research, the three phases of research distinguished by Dr. Bush, are now beginning to get along in cousinly amicability. Pure research, Dr. Bush points out, is in the tradition of academic scholarship. The pure researcher wants to understand the world, not manipulate it. Much of his pure work is purely worthless, except to point out blind alleys to

stay away from in future work. From pure science sometimes come consequences of a world-shaking nature. You may have heard of atomic bombs. *Applied* research, on another hand, is science for a particular purpose: to accomplish a specific practical result.

Fundamental research comes somewhere in between pure and applied research, joining the two, mediating between them. Fundamental research is like pure research in that it investigates general principles not specific to any one problem. It is like applied research in that the man who does it has practical significance in the back of his mind. All three kinds of research, living together and leaning on one another for facts and ideas, are necessary for a robust science.

The recent war, of course, did much to make both scientists and nonscientists realize that pure vs. "impure" was maladaptive. Before the war, many governmental and industrial leaders looked upon academic scientists as people in the ivory tower, bare naked of practical utility. And many of us, regarding ourselves pure, thought the same thing. In the war we all came to realize that the gap could be closed, that pure psychology could be adapted and extended to utility in areas we previously had not dreamed of in our "long-haired" philosophies. And we also came to realize that many practical problems could be solved imaginatively only if we turned back to the laboratory to some fundamental research.

This convergence of pure and applied is well illustrated by the subject of my paper—human engineering. In fact, it is by such a convergence that human engi-

neering is just now becoming an important field in psychology. In the early decades of the industrial revolution industrial managers did not bother about man's compatibility with machines. Machines were designed without any regard for the workers who would operate them; workers were simply taught to operate existing machines. If they could not make good, they were replaced with those who could. Early in the present century, Taylor, and later the Gilbreths, engineers by profession, became interested in human methods of work. They began to develop a phase of engineering having to do with the most efficient methods of operating machines. This field of interest has come to be called motion-and-time engineering. The field is frankly practical: it takes concrete men and concrete machines and attempts to work out the best ways for them to get along together. The aim was more efficient production. At that time, few psychologists were concerned with the practical problems of industrial efficiency; the majority were engaged in pure research in such things as perception and psychomotor functions.

But in the late thirties the research of the two groups began to converge. Motion-and-time engineers, though continuing with the analysis of specific problems, undertook more and more fundamental research to find basic principles of motion-economy. The pure researches of psychologists had gradually added up to a great deal of systematic information upon which both the psychologists and the motion-and-time engineers could draw for applied research. Faced with the enormous and ever increasing complexity in in-

struments and machines, industry and government turned more and more to these experts who seemed able to make meaningful declarative sentences about men, machines, and the results you could expect when you turned one loose on the other.

There is no need to impress upon you how complicated the problem became in the technology of war. We have all seen described many times the complexity of controls and instruments in a B-29, or a Sherman, or a submarine, or an airplane control tower, or even in the personnel office. The significant thing is that the problems engaged the attention of so many research workers. Psychologists, motion-and-time engineers, anthropologists, and physiologists all went to work on these man-machine problems. They reached many dramatic successes. But they only scratched the surface. Unfortunately, too few people realized the importance of human engineering at the start of the war, and when groups were formed to deal with the problems, the problems, for practical purposes, had often evaporated. Designs had been frozen and equipment had been shipped to the theaters of war. Many machines were already fighting and already making near-neurotics out of the men who tried to work their gadgets and "gismoes."

It will not be possible, unfortunately, for me to review properly the human engineering work that was done during the war. Nearly all of such work was classified at the time because it had to do with specific military devices. Much of the work has since been declassified, but it is not yet easily available to ordinary

citizens. In another year or two, some summary reports will be published reviewing various phases of the work. The process of declassification will have been completed, and many of the researches will appear in our regular journals.

In the preparation of this paper, therefore, I have had to rely for the most part on work which has been published and on aspects of war work with which I have been particularly associated and whose release from military security I can be assured of. My account, therefore, will undoubtedly do injustice to many whose work has been important. But I hope that the references to work in this paper will be taken as examples illustrating trends in research rather than as a comprehensive or representative cross section of research work.

There are, of course, many ways of discussing any subject, but a survey of trends in human engineering, however presented, ought to touch upon five principal aspects of the adjustment of men and machines: (1) *personnel selection,* (2) *training,* (3) *methods of work and the workplace,* (4) *the design of instruments and machines,* and (5) *the working environment.* Let me consider each of these briefly as an introduction to the principal discussion.

Of these five aspects, psychologists have been concerned principally with the first two: selection and training. In the past fifteen years great strides have been made in the development of selection tests and in methods of training operators of various devices. So important has this work been, that in the minds of many, if you subtract selection and training from

applied psychology, your remainder is zero. Most textbooks in applied psychology devote the majority of their pages to selection, training, and management of personnel. The Applied Psychology Panel of the National Defense Research Committee began as the Committee on Selection and Training of Service Personnel.

In this conference, however, the paper by Dr. Flanagan covers personnel psychology, and there is no need for me to encroach upon his review. Moreover, the most recent trends in human engineering lie in the other three areas, especially the design of instruments, and it is these I should like to stress. This paper, therefore, will be divided into three main sections: (1) the working environment, (2) work and the workplace, and (3) the design of instruments.

The Working Environment

People in all walks of life have become conscious in the past few years of the importance of the environment in which they work. We have become increasingly aware that light, sound, temperature, and ventilation have much to do with human performance in airplanes, factories, offices, and lecture halls. Just the studies of the physiological environment, such as oxygen, carbon dioxide, humidity, would take many pages to review. But I shall neglect them, because they are now so numerous and complete and because there is time to talk only about the more strictly psychological phases of human engineering.

Noise. As our civilization has become noisier, the

problem of the effect of noise on human efficiency has become increasingly prominent in both industrial and military applications. As a result, there have appeared in recent years a host of major and minor studies of the effects of noise. Enthusiasts for noise reduction have claimed dramatic increases in production by reducing industrial noise. Controlled and extensive studies, however, do not justify such excitement.

Probably the most exhaustive studies of the effect of noise on man were conducted by Stevens and his collaborators early in the war at the request of Army Air Forces. Subjects were exposed day after day for as many as eight hours at a time with extremely high intensities of airplane noise, and were given nearly 100 different tests of intelligence and psychomotor efficiency. No significant effects could be detected in any of the test results, despite the fact that people subjected to the barrage of decibels claimed they did not like the noise and felt fatigued by it, and were less tolerant of their friends at the end of the day. Other less exhaustive studies performed in military establishments have given essentially the same results.

Berrien and Young recently published what is perhaps the best survey on the relation of noise to industrial performance. They tried to find out if reduction of factory noise by acoustical treatment made workers any happier and/or efficient. They were unable to show that noise-reduction has anything to do with industrial output. They did find (to the surprise of very few people) that workers hear better when it is quieter. What's more important, they showed that the worker's

ears do not ring so loudly, that his comfort goes up and his irritability down when noise level is reduced.

But the chapter is not closed. There is still some important research ahead. We need new methods for studying the relation between noise and people. The studies to date, using quantitative tests, have revealed nothing of significance. Yet most people are quite emphatic about their dislike of noise. It is probable this dislike, in realistic situations, has some effect on human performance, if we could but measure it. One subject in Stevens' experiment, for example, reported that after hearing and feeling his daily dose of decibels, he felt much more inclined to beat his wife. The experiment, however, did not measure such tendencies.

Music. Though just plain noise seems to be inconducive to good work, the right kind of music around the worker is allegedly beneficial. We all know that music in industry became a fad during wartime. It is hard to tell whether the claims made for the effect of music on production are justified, for controlled studies free of contamination by other possible causes are scarce. What evidence there is seems fairly convincing. In fact, those who have been using music as an aid to production take its beneficial effects for granted. Now they are wrestling with details of scheduling programs and are asking such questions as, How many hours a day should music be scheduled? Should there be more music on Mondays (after "lost weekends") than on payday? How much classical and how much popular music? Should the music have conservative or tricky arrangements?

Lighting. The effects of ambient illumination and lighting on various visual and psychomotor functions have been the subject of intensive fundamental and applied research for many years. As a consequence, there is now established a full-grown science of illumination engineering, covered by several textbooks on the subject. It is unlikely that there will be any remarkable developments or new trends in this field in the years that lie just ahead. For most work situations, it is possible to consult standard reference works and find the answers to practical questions about illumination and working efficiency.

There are, however, many specific situations in which applied research will have to be conducted. These are mostly of the variety where the eye must perform in two environments, one of high illumination and one of low. During the war, for example, there were several studies of the problem faced by night aircraft pilots, who must remain dark adapted for vision of objects outside the plane and at the same time must see instrument panels and controls within the plane. Similar problems are faced when individuals must do most of their work in daylight or conditions of high illumination but at the same time must frequently use a radar indicator under conditions of low illumination. Special situations of this sort require further research to find the best conditions of lighting of the external environment for the best over-all working efficiency.

Color dynamics. Coming to the fore recently is another question about the working environment: Does

the use of color schemes for walls and machinery have anything to do with efficiency in work? The Pittsburgh Plate Glass Company, which manufactures paints as well as glass, says yes. They have put out brochures making claims that worker comfort, morale, and production have been upped by painting walls in various pastel shades. It is hard to tell whether there is any truth in the claim, for finding out what factor causes a jump in production is a complex problem. But there is now a great deal of interest in the problem, and we may expect current and future research to give us some sort of answer to it.

Work and the Workplace

All of the factors involved in human engineering interact to such a degree that it is hard to draw any clear lines for the purposes of classification. It is difficult, for example, to distinguish between the task that the operator has to perform and the design of the machine that determines, in many respects, the nature of his task. For the purposes of discussion, however, we may consider, under the heading of work and the workplace, those factors related to the position and comfort of the operator, the movements that he is asked to perform, the working areas and perceptual areas within which the task must be carried out. Then, in a later section, we may consider the psychological factors in machine design.

Visual fields. An elementary consideration, but one which has often been neglected is the visual field within which an operator can work effectively. Early in the

war the design of airplane cockpits, for example, made pilot efficiency less than optimal because the field of vision outside the plane was too restricted. And, on the other hand, instruments and controls within the plane were distributed over too large an area to be used within the normal binocular field of view. As a result, the pilot, in maneuvering the plane, and searching the air, was quite a bit busier than was good for him. The standard arrangement required, among other things, too many head and neck movements. Basic measurements on normal binocular fields have been available for many years, but several studies were carried out at the Aero-Medical Laboratory (Wright Field) during the war to establish norms for flying personnel and to set up limitations in the construction of plane cockpits. Very little *basic* research remains to be done in the area, but in both industrial and military situations specific applications for specific and unique tasks are still to be worked out.

Working areas. Some problems are so simple that we easily neglect them. One such problem is the area in which a man can work normally and comfortably. Many tasks are so set up for operators that they must reach to distances with their hands and feet that their creator never intended. Often to do their job they must contort themselves with shifts of bodies, twists of the head, and stretches of the arm. Only recently has this problem been given much thought.

Now there are measurements of normal working areas for a number of specific tasks. Such measurements, of course, vary with a number of factors: the

body- and limb-dimensions of the operator, how far away are the surfaces with which or on which he must work, the plane of the surfaces (whether vertical, horizontal, or inclined) and the contour of the surfaces (whether flat, curved, or angular). As matters stand, new measurements are made for each set of new circumstances. A great deal of effort would be saved if we took the time to do fundamental studies in which the interrelations of these variables were studied for representative groups of operators.

Work position. Efficiency-minded people very early had a look at the comfort and postural adjustment of the worker's body. They found they could bring about dramatic increases in production by letting the worker have a chair that gave the natural architecture of his body a decent break. Chairs of the proper height and design, somewhat adjustable to the individual's habits of, and equipment for, sitting, serve to simplify the task, decrease fatigue, increase comfort and, withal, increase output by as much as 50 or 100 per cent.

But it is easy to neglect the importance of work position, because design engineers have so many other difficulties in technical design to think about that they push to one side, or leave to the last, the question of how the operator will sit or where he will stand. During the war, for example, psychologists who were trained and paid for less simple-minded activity often found that their most dramatic contributions to war consisted of pointing out elementary mistakes in the height of a chair or the size of a pedestal. The idea, however, is catching on and in the future we may expect design

and tests to pay heed to comfort and to work position.

Distribution of effort. This is not the place to go into the problem of fatigue, how to avoid it, and how to distribute work. Long before the war, we were familiar with studies of the best way to spread rest and work on various tasks. Such studies usually show that it is best to have relatively short periods of work with frequent rest periods. For a great many tasks, a forty minute work period with an eight minute rest period gives the most effective schedule, but each job must be studied individually to find the rules that fit the job. Such studies were carried out during the war for several military tasks. One may expect them to be repeated and extended as new devices in industry and elsewhere create new tasks.

Body movements. For years we have had rather good fundamental data concerning optimal methods of carrying loads or of making gross movements. Bedale's study in which energy expenditure was measured for many different ways of carrying loads is now a classic. And there are many studies applicable to particular problems, such as wheeling a barrow. During the war there were a few similar studies, such as ammunition handling and loading and unloading ships. As is usual, they showed that substantial improvements in efficiency could be made in old work practices, by picking the work methods which conserved time and energy expenditure in body movements.

Limb movements. In addition to matters of comfort and position, the great contribution of motion-and-time engineering has been to work out methods for the

analysis of movements involved in various tasks. First the Gilbreths, and later many others, developed methods of photographing representative performance of tasks by skilled operators and of analyzing the movements into their components. In this way it was possible to construct charts showing how long each movement takes and what movements are going on simultaneously. From such charts it is possible to determine what movements are wasted, what changes in the sequence of movements might be desirable, and in what ways the task might be divided between the hands and feet to allow for simultaneous performance of movements that formerly were performed in series. Such micromotion studies have continued to produce dramatic results in industrial practice. It is characteristic · of them, however, that they are applicable to particular tasks and do not, of themselves, give fundamental knowledge of utility in a wide variety of tasks.

The trend in recent years in the work of both psychologists and motion-and-time engineers in this area has been to carry out more fundamental studies of movement patterns, from which can be derived general principles for the design of tasks. Some, for example, have shown the superiority in physiological efficiency of the ballistic swinging movements over the fixational, back-and-forth movements. Others show that rhythm and symmetry are good things to have. Movement in which there is no quick interruption is slicker and quicker than linear or reversing movement.

Basic studies have been accumulating, moreover, on the work capability of different parts of the body.

One study covers the relation of posture to strength of pull in the arms, another the muscle force that can be exerted in the ankle flexors, another the power performance of the fingers, another the power performance of the hands and wrists, and another the relation between height and leg strength. In addition, there are several basic studies of this sort performed in laboratories of the Army Air Forces which will ultimately, it is to be hoped, be made available in our journals.

There will, I am sure, be many more studies of the psychomotor functions for the design of work tasks. They are most likely to happen in government sponsored laboratories because they are of considerable practical importance in military tasks. There are several rather fundamental problems which are especially interesting, some of which are now in progress; for example, analysis of gross approximating movements and precision movements in visuomotor tasks; effects of friction, gear ratios, handwheel radii, and the amount of strength that can be exerted by bodily members in various directions. Such studies ought to make appreciable strides toward establishing a fundamental science of movement.

The Design of Instruments

The most important and most interesting trend in human engineering is the use of psychological methods in the design of instruments. Before the war there were only isolated instances—and these were mostly a matter of changing production and assembly lines—of

either fundamental or applied research. During the war, however, many a psychologist found himself working on such problems. He may have started out to win the war by selection and training, but the devices he·encountered often needed his talents more than the personnel who were supposed to operate them. So he ended up evaluating and redesigning equipment or doing fundamental research in that direction.

Training devices. The work done falls into two categories. One is the evaluation and design of training devices. Such devices were used in great numbers in war training. There were radar trainers, gunnery trainers, telegraphic code trainers, night vision trainers, voice communication trainers—all sorts of trainers.

About each of them the psychologist asked: Does this trainer really train the men for the job it is supposed to? If not, why not? What can be done to make it a more effective trainer? The questions, of course, were answered experimentally. In many cases the results were dramatic. Trainers were shown to be completely ineffective, or redesigning made them do their job effectively. The work proved itself, and it is still continuing apace in government laboratories and, under contract, with a dozen or more universities.

Applied Research and Development

With that brief comment on trainers, we come to the real McCoy, the design of instruments which the men must operate. Here the difference between fundamental and applied research is worth emphasizing. Applied research is done with machines already made;

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fundamental research is concerned with machines yet unborn. It gets at psychological principles that might be useful in the design of future machines, and it uses especially constructed apparatus having no specific and certainly no isomorphic relation to the machines which the results may eventually bear upon. First let us take a look at recent and current applied research.

Selection of instruments. If industry or the military are confronted with a new task where instruments are needed, generally a variety of instruments is available either commercially or in developmental form. The first question to ask, then, from the standpoint of human engineering, is what instrument, of those available, can do the best job? Within the past few years, there has been an increasing tendency to develop psychological tests for answering the question. It is impossible to name all the studies in which there has been a psychological selection of instruments, but a few examples should illustrate the trend.

When the Army and Navy Air Forces felt the need to design new interphone systems for aircraft, many makes of microphones and earphones were commercially available. Which were the best? Psychologists at Harvard University developed methods of testing speech intelligibility of the various instruments, ran exhaustive tests, and picked out the microphone and earphone which would do the best job.

There was a similar problem with hearing aids. When the military services embarked on a program of aiding the deafened veteran, they set up facilities for testing hearing aids in the laboratory under conditions

simulating deafness. Information was obtained which would allow the selection of a few of the best hearing aids, from among the dozens available commercially. Just one more example. There are many types of indicators for the instrument panels of aircraft. In laboratories of the Army Air Forces standard psychological testing situations were developed for selecting the indicator which would do the best job of indicating. These are only a few examples.

Standard *physical* tests for the selection of instruments have been used for many years in industrial and government laboratories, but it is only recently that psychological tests have been used. It has recently dawned on people that every instrument has a human being at one or the other or both ends of it. The military services, by and large, have been convinced of the value of such man-instrument tests and are setting up groups in government laboratories and under university contract to continue them. There is still the need for the development of tests for many types of instruments. To date, industrial practice has not made too much use even of the available tests. But in the coming years one may expect a steady advance in psychological methods of selecting instruments. The trend will reach into all areas in which instrument design for human use is important.

Such psychological tests serve, of course, not only to select from existing instruments but to evaluate the adequacy of any proposed instruments. New ideas for instrument design have formally been left to engineers concerned primarily with engineering details.

They have usually been evaluated only by the sometimes happy, sometimes unhappy, hunches of engineers and managers. More and more in recent years, both in industry and government, new designs of equipment have been turned over to psychologists or motion-and-time engineers for evaluation in terms of the performance of operators in accomplishing the tasks assigned to man and the instrument. We may expect this trend to continue.

Operation of equipment. A closely related problem, and one which is the subject of psychological tests, is the evaluation of alternative methods of using equipment. Much equipment, which is useless or inefficient when operated improperly, may do its job very well when psychological tests show clearly the best way to operate it. Radar indicators, for example, are supplied nowadays with gadgets to improve the accuracy of reading signals from them. Careful study of the performance of operators sometimes shows that their work is just as accurate and much faster if they do not use these gadgets. In another example, recently, a large radar indicator was about ready to be rejected because of the poor performance it was giving in service use. But careful experiments showed that, contrary to the operator's instruction book, adjusting a few controls to conform to principles of brightness discrimination made the instrument quite satisfactory. In the use of interphone equipment in the presence of intense noise, psychologists showed that if operators held their microphones properly, satisfactory communication could be established and if they did not, communication was

poor or even completely impossible. These are just a few of many examples in recent years of the importance of psychological evaluation of the proper methods of getting out of a gadget the best that is in it.

Fundamental Research

No matter how fervent we may be in putting psychology to work, as scientists, we cannot get too excited about tests of particular equipments. Larger and more basic rules are much more interesting. More than that, they are more useful in the long run. So long as we run tests on particular equipments, we are limited in the improvements we can make, but fundamental data open up completely new possibilities which might otherwise never occur to us. Then, too, tests must be run over and over again, but one fundamental study can answer a host of problems.

So it is encouraging to see that fundamental research, not just tests, is now on the upswing. More and more psychologists, both pure and applied, are mapping out fundamental investigations to be of general usefulness in the design of equipment. Here there is time to single out only a few examples which show the way such work is going.

Anthropometric measures. No account of fundamental research in human engineering would be complete without telling briefly the part played by anthropometry in practical problems of equipment design during the war. A group of anthropologists at Wright Field made thousands of physical measurements of flying personnel. Then, knowing the means

and variabilities of these measurements for the air crew population, they were able to set up certain general requirements of space and shape for air crew positions, such as cockpits and gun turrets. These requirements set the frame of reference for other, psychological studies on cockpit design. Worth mentioning, too, are the anthropologists measurements of head sizes and shapes. From these, models of different heads were constructed which were invaluable in the design of helmets and oxygen masks. In such work, we see an interesting application of fundamental anthropometry to human engineering—one which goes hand in hand with the psychologist's work.

Code, shape, and position of controls. Some work was done during the war on the problems of how to code various controls on equipment, how to shape them so that they could be manipulated easily and be distinguished easily from each other, and where to place them for greatest convenience and ease of operation. To my knowledge, at the present time public announcement has not been made of the release of these reports for publication. Let me simply say here that the work so far is rather specific to particular applications, and that there is room for considerable fundamental research in this area. Some such work is in progress now in several university laboratories under contract with research agencies of the services.

Vision. Perhaps fundamental research is so far advanced in vision that there is little more to do. Or perhaps no one had the foresight to set up a central laboratory in wartime for fundamental research rele-

vant to instrument design. At any rate, recent years are not distinguished by such research. In only a few cases and areas has real progress been made.

One is the matter of binocular fields. At the start of the war the design of several types of equipment seemed to ignore limitations in binocular vision. Airplane cockpits were a good example. When evidence became available that the field of binocular view permitted by a given cockpit design had some relation to number of accidents and other aspects of flying, fundamental studies were instituted to measure carefully the fields of binocular vision. These later established requirements for cockpit design.

Other fundamental researches concerned minimum visibility of the eye under various conditions. Classical research told us that the visible spectrum extended from about 4000A° to 7600A°, and that was good enough for most purposes. But with the advent of many ultraviolet and infrared devices, it was important to know whether extremely high intensities of infrared and ultraviolet might be visible. So the visibility curve of the human eye was studied again at high intensities. The result was to show that our vision extends from 3130A° to 8000A° and that only radiations outside these limits are indetectable by the human eye.

Closely related is fundamental work on the light and dark adaptation of the eye to different wave lengths. The need to have instruments visible without destroying dark adaptation and to preserve dark adaptation during periods in the light provided the incentive

for studying the interrelations of the visibility curve and adaptation of the eye. From such data, gathered by several different workers, it was possible to determine several important facts: the right kind of red goggles to use to preserve dark-adaptation, the time that such goggles must be worn to dark adapt the eye while in daylight, and the wave lengths of light to use in a number of lighting problems.

To be mentioned finally are fundamental visual studies of the visibility of objects. To provide data of use in the design of visual camouflage, visibility was studied over a wide range of conditions: for fields ranging from 100 millilamberts to total darkness, for objects ranging from 360 to 0.6 minutes of arc, for shapes from circles to 100:1 rectangles, for exposures from 6 seconds to many minutes, and for backgrounds both brighter and darker than the object. It is easy to see that such systematic data as were obtained should answer almost any detailed question one might raise about the design of objects to minimize their visibility.

Hearing. Let us take up finally recent fundamental research in speech and hearing. The advances made in this field are quite striking, partly because there was so much to be done and partly because, all through the war, there was a central laboratory, the Psycho-Acoustic Laboratory at Harvard University, whose job it was to conduct fundamental psychological research relevant to the design of communications equipment and other special equipments. A few illustrations may be chosen from the work of this laboratory.

First, there is the question mentioned earlier of the

effect of noise on man. In addition to tests of psycho-motor performance during long periods in intense noise, basic experiments were done on the annoyance value of different frequency bands of noise. The bands were presented to observers so that they could vary intensity to give a match in terms of annoyance. From these experiments, one could see, in general, what frequencies were more annoying and how much so. It turned out that high frequencies are the best annoyers and that fact could be used in recommending methods of noise reduction in airplanes, submarines, and factories.

Another fundamental study was undertaken to determine the fidelity required of earphones for use in communication in noise. By measuring speech intelligibility with high frequencies cut out in varying amounts it was possible to decide that earphones should be so designed that they have a high fidelity response up to about 4,000 cycles per second.

In a somewhat similar fundamental study the question was how to design sound-powered microphones and earphones—that is, telephone systems which have no battery or amplifiers, but rely entirely on the energy derived from the voice for their operation. A fundamental research was undertaken in which speech intelligibility was measured with various pass-bands of frequencies of the voice and at different intensities. From these data design engineers can tell what to shoot for in the construction of sound-powered telephone instruments and systems.

Another fundamental research concerning the dis-

tortion of sounds is paying great dividends in radio communication. Speech sounds were distorted in various ways and in various amounts by clipping the tops from the speech waves, by rectifying them, and by clipping the center from them. The effects of these distortions on intelligibility was carefully measured. From that, it was apparent that the high intensity vowels can be greatly distorted by clipping the tops of the waves without any injury to speech intelligibility, whereas loss of the consonants (sounds which are relatively weak in speech waves and are lost in center clipping) would greatly impair speech intelligibility. By applying these results to the design of radio transmitters in such a way as to distort the speech deliberately, it was possible to gain an advantage of more than 10 decibels in the power of transmitting stations. Thus, by applying fundamental research to the design of communications equipment, thousands and thousands of dollars were saved that otherwise would have gone into making radio transmitters 10 times as powerful.

Still another area of fundamental auditory research came up in the design of hearing aids. Companies manufacturing hearing aids have made a great fuss about designing aids so that their frequency characteristics corresponded to individual differences in deafness. A fundamental investigation was conducted with an experimental hearing aid capable of giving precise control of tone and distortion. From this study there came basic data for the design of modern hearing aids. It turns out that "custom-fitted" hearing aids are unnecessary for the vast majority of the hard-of-hearing

cases; a high-fidelity hearing aid with the same characteristics for all individuals is usually better than specially fitted aids. It was also shown that an important feature, previously lacking, should be incorporated in hearing aids, that of limiting the peaks of sounds heard by the wearer to a level just a little below his threshold of comfort.

These are some of the more remarkable fundamental researches which were useful in the design of auditory equipment in wartime. There are other examples which could be cited and others which are still under military restriction. What has been done thus far, however, is just the beginning of a trend. There is considerably more fundamental research—some of it in progress now—that should be done to explore the utility of auditory signals in various sorts of instruments. Unlike what we know of the field of vision, we as yet know very little about the auditory illusions that may be produced and utilized in practical situations. Until recently it was not possible, for electronic reasons, to study various auditory discriminations of complex noises. Now we can study them, and it is possible that we may in the future convey to the ears all sorts of precise information that formerly had to be conveyed visually. It is possible, for example, that we may be able to design auditory instruments, on the basis of fundamental research with complex sounds, which will make real blind flying possible. A start in that direction was made during the war, but further advances depend upon the results of fundamental research now in progress.

Conclusions

Thus concludes my review. It is cursory, for there is far too much material to be covered. Moreover, we are concerned here with trends, not with details. The trends are impressive. Just a few years ago human engineering was not a field of psychology. Today it is. Both fundamental and applied human engineering are moving rapidly. The literature is growing by leaps and bounds. And in more than a score of universities programs in human engineering are proceeding hand in hand with pure experimental psychology and with personnel psychology. Much of the work is supported by funds from research agencies of the Government, particularly of the Army and the Navy. Special credit is due these Government agencies, I think, for the important part they are playing in the development of this field of psychology.

THE SAMPLE INTERVIEW SURVEY

A Fundamental Research Tool of the Social Sciences

RENSIS LIKERT

TODAY I wish to discuss a research instrument which is rapidly becoming one of the fundamental research tools of all the social sciences. The sample interview survey is one of the few procedures which can cope with the problems in present-day society, on an integrated, rather than a segmental basis. The traditional disciplines in the social sciences and their related methodologies frequently do not fit present-day problems and under the impact of attempting to deal with these problems the lines of demarcation between the disciplines are disintegrating. The sample interview survey is facilitating effective interdiscipline research because of its capacity to deal with problems as functional wholes.

The sample interview survey is the combination into a single procedure of many developments in recent years in sampling, interviewing, research design, attitude measurement, content analysis, and motivational theory. In view of the many developments, it is not surprising that the sample survey has many origins.

One origin is the present-day poll and the earlier straw vote. Both of these demonstrated the ease with which adults can be polled and the value of the data obtained from small samples. Possibly the greatest con-

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tribution of the straw vote and of the later polling has been their great and extremely important success in arousing public interest in their results and, especially since the Gallup Poll, in convincing the public that accurate results can be got from small samples.

Another important origin of the sample survey has been the extensive amount of work done by business in the broad area known as consumer market research. This again has contributed to the acceptance of results based on interviewing small samples.

With regard to methodology, one of the most important origins of the survey technique has been the recent work in the field of sampling. This work has developed methods for selecting relatively small numbers of persons out of a particular population or group in such a manner that an analysis of the characteristics of those that are selected reveal the pattern that exists in the entire group. Leadership has been provided in sampling principally by agencies of the Federal Government. Starting with Neymann's paper[39] in 1934, the development of stratified random sampling as applied through area sampling has been fairly rapid, especially in the past ten years. (A selected bibliography on sampling techniques for use in sample surveys is appended.) The Census Bureau, Bureau of Agricultural Economics, and Bureau of Labor Statistics as well as Iowa State College and North Carolina State College are the governmental agencies that have made the major contributions to the development of sampling techniques. The two state colleges were assisted in their work by federal funds.

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Another origin, so far as methodology is concerned, and one that will become increasingly important is that field of mathematical statistics known as design of experiments. Related to this, also, is the contribution of well-established methods of good research design which have long been recognized as essential to scientific methodology.

The field of attitude measurement has made major contributions to the development of the methodology of the sample survey. The need for questions that are clear and unambiguous, that deal with a single attitude continuum and are not double-barreled was first demonstrated in the research devoted to the measurement of attitudes.[11, 16] Attitude research demonstrated also the stability of attitudes and the reliability with which they could be measured with relatively few questions. In fact, when it was found that single questions could measure attitudes with reliability coefficients of .70 or better,[14] a new approach to the problem of the origin of attitudes was suggested.

In the attempt to discover what determines attitudes, extensive use has been made of attitude scales and correlational analysis. But this approach has not proved very fruitful. When attitude scores were correlated with measures of information and socio-economic status, low correlations were almost always obtained.[14] The need for data which gave more insight into cause and effect relationships immediately became evident. Since a single good question would measure an attitude with adequate reliability for most group purposes, the need became evident for asking fewer questions on each

attitude continuum and more questions on such variables as where the attitudes came from, past shifts in attitudes, and factors associated with these shifts.

This development led to a shift from measuring single attitudes precisely to attempting to measure the characteristics of the matrix in which the attitudes is embedded, while measuring the attitude with moderate reliability. Attitudes are always embedded in a matrix of information or misinformation, past experiences, other related attitudes and motives, and similar variables. To have measures of these variables permits a better understanding of the origin and functioning of the attitude and of the causal factors underlying it than when the only data available are measurements of the attitude.

One other shortcoming of the attitude scale has played an important role in the development of the methodology used in the sample interview survey. Most attitude scale research was based on work with students. They, at times, objected to being restricted to the question alternatives as stated and insisted that none of the alternatives gave them an opportunity to express their attitudes correctly. These objections were usually ignored and the students were told to answer the questions as directed. This procedure, worked reasonably well with students, but when it was tried on the adult population entirely different results were obtained. When respondents, in their own homes, were told that the fine points in *their* thinking did not matter, that they had to restrict their thinking on the problem to the dimensions seen by the experimenter and

that alternatives were limited to those that *he* stated, rapport went out the door and often the interviewer was close behind. No wonder most polls restrict the interview to not more than ten minutes.

These difficulties encountered in interviewing groups other than college students made clear a serious weakness in attitude scales. They restricted the respondent in a manner to offend his ego. Further experimentation soon demonstrated that this restriction was not necessary. It was found that the alternatives the respondent preferred and stated in his own words could be scored and analyzed.[12] It was found, moreover, that to encourage the respondent to state his attitude in his own concepts encouraged his co-operation. This experience led to the use of the open question and the development of the fixed-alternative, free-answer interviewing technique.[19]

This development represented an important step forward in the evolution of the methodology of the sample interview survey. It meant that the importance of the active, willing co-operation of the respondent was recognized as a necessary condition for all survey research that is expected to yield valid results.

The importance of respondent co-operation throughout the interview and the necessity of limiting the procedures used in polls and surveys to those which develop and build this rapport does not yet seem to be recognized generally. The questions used by most polling organizations still are primarily of the fixed alternative form and they insist that respondents answer only in the categories stated.[1] The only recognition that the

rapport of these pollers is important is to use a question or two in starting the interview which is intended to catch the interest of the respondent and thereby "to build rapport." Many of the interviewers of these polling organizations, however, feel the necessity for better rapport. They frequently modify the prescribed procedure by permitting respondents to answer as they desire and then the interviewer checks the alternative which he feels comes closest to what he believes the respondent means.

A very important discovery was made when, in order to build rapport, respondents were encouraged to talk freely in answering questions. On fixed alternative questions, it was discovered that the alternatives often will have different meaning for different respondents. It is not unusual to find that a given alternative will have two or three different meanings, each of which is mentioned by a substantial proportion of those who approve it. The finding that the meaning of alternatives often varies added a second important reason for using open questions or for using fixed-alternative questions only when employed with a free-answer interviewing procedure. Unless the respondent elaborates his answer sufficiently to make clear the meaning he has in mind, the analyst does not know what the respondent means by the approval or disapproval he has voiced.[6]

Unfortunately, the fact that alternatives frequently have different meanings for different respondents is not generally recognized by most polling organizations. Relatively few attempts are made by most polls to discover exactly what respondents mean and to apply

the results of discovery in interpreting the data obtained. At times polling results are seriously misinterpreted by the analyst and by readers because of a lack of control on meaning.[8, 15]

The sample interview survey, as we have seen, owes its existence and present methodology to many sources. Now that we have examined briefly its origins and some of the experiences that have influenced its development, we turn to a consideration of what it is and how it can be used.

As its name implies, the sample interview survey involves obtaining data from a sample of respondents by means of a systematic interview.[2] Most surveys obtain several different types of data. In addition to attitudes and opinions, information is usually obtained on the personal characteristics of respondents, such as their age or education; their knowledge and misinformation on items related to the problem being studied; their experience and behavior on matters related to the study; and, finally, the motives underlying their attitudes and behavior. This research tool can be used to study a very wide variety of problems involving human reactions and behavior. I can perhaps best illustrate what it is and its possible uses by discussing some of the specific steps involved in planning and conducting a study.

Last year, as the division of program surveys in the Department of Agriculture, we undertook a national survey of liquid asset holdings, spendings, and savings for the Board of Governors of the Federal Reserve System.[19] We are repeating this study this year with

some additions. The general objectives of the study are to obtain data to show:

1. Distribution of liquid asset holdings at the beginning of 1947,

2. Past and expected disposition of accumulated assets, and factors affecting the disposition of assets,

3. Past and expected rate of saving, and factors affecting rate of saving.

To realize these objectives a total of 3,000 interviews has just been conducted on a nationwide sample. To increase the accuracy of our results, we interviewed more persons in the upper income groups than would normally occur in a cross-section sample. This is done primarily by increasing the sampling ratio in those areas having high rental values.

The sampling method that we employ always involves strictly random procedures and as a rule it utilizes area methods. It differs materially from that used by virtually all polling and consumer market research agencies.

The dwellings in which interviews were conducted were selected by our sampling staff. Our interviewers had no freedom or latitude in selecting respondents. In this study they were instructed to interview the heads of all spending units in the designated dwellings.

The designing of the sample[7] involved two major steps: first, the selection of the localities in which interviewing would be done, and second, the selection of the specific dwelling units within these designated localities. Both of these steps were conducted so that each dwelling unit (and spending unit) in the country

had an equal—or where we oversampled, a known—probability of appearing in our sample. The sample was designed to be truly random and without biases.

In selecting the localities in which we would conduct interviews we necessarily included all the metropolitan areas having over one million population. These cities include too many people and too much of the income and savings of the nation to be omitted. All the rest of the nation was then grouped by counties. There were fifty-four of these groups of counties, and each group included approximately the same proportion of total population as that included in each of the other groups. Technically speaking, samplers call these groups of counties, strata. From each stratum one county was selected by using random numbers to represent it.

In arranging the counties into strata the purpose is to have the counties in each strata as homogeneous as possible and to use variables for the grouping which are known or suspected to be related to factors being studied in the sample survey.

After the metropolitan areas and counties which are to be sampled have been selected, the task is to designate specific dwelling units. In cities, census block statistics are used to group homogeneous blocks and a sample of blocks is picked by means of random numbers. Then by means of up-to-date detailed maps or a list of all dwellings on the block, specified dwellings are selected at random and used in the sample. In rural areas the county is broken into small geographical units containing about three to five farms. These are numbered in such a manner that when one of the units

between l and n is selected at random and every n^{th} unit thereafter, the selected units will be widely scattered over the country. Aerial photographs on an enlarged scale, showing each farmhouse, are then obtained for the units that have been selected and the interviewers are instructed to interview the heads of all spending units in each dwelling located within the designated area.

The interviewers are instructed to complete interviews with the heads of all the spending units selected in the sample even though they have to make two or three calls back to find the person and make the interview.[18] In case the person cannot be found or the interview completed, a full report is sent to us but no substitute is made. In designing the sample we include a somewhat larger sample than we finally need. This gives us leeway in case a small proportion of respondents cannot be located or interviewed. But we do not substitute people that are easy to find for people that are hard to find, because we know people differ in many important respects.

The method of sampling that we employ enables us to expand the data obtained from our interviews to estimates for the entire population. Last year, for example, we expanded the results from our 3,000 interviews to national estimates for income, ownership of government bonds, deposits in savings accounts, amounts held in checking accounts for personal use, amounts to be spent on automobiles, homes, etc. The quota method of sampling, which is ordinarily used by consumer market research agencies, yields results

which are difficult and often impossible to expand to estimates for the entire population. Results obtained from quota samples often have biases in them which introduce substantial errors in any total estimates. At times these errors can be reduced by weighting the data from the sample so as to make them correspond with certain known facts. However, to use this procedure to remove biases on known factors offers no assurance that all of the biases are removed from the variables being studied. In fact, some of this weighting may even increase the biases in the variables that are being measured.

In designing the interview for the Federal Reserve Study the first step was to list the specific tables that would be needed to meet the objectives of the study. From this list of tables the questions required to obtain the desired data were prepared. After this preliminary draft of the interview-form was completed, those in charge of the study spent over two weeks in the field testing and improving it. They were assisted in this by a few of our best interviewers.

We invariably field test each interview-form before using it and find always that changes are necessary. There are several reasons for this pretest. Some of the more important are as follows:

I. To test question wording. Each question must be so clearly worded that it is readily and correctly understood by all respondents. In fact it should be so clear that it cannot be misunderstood. In addition, the question wording should be of an easy, conversational style.

It is more important to have the wording easy in style than to have it phrased in the best English.

II. To test whether the questions secure all the data required for the tables that have been specified. An important part of the pretest of each interview form is to discover whether the questions, as finally worded and arranged, obtain answers which when coded and analyzed will yield data which will meet the objectives of the study. The study director, consequently, codes the pretest questionnaires. Often it is necessary to add a question here or there so as to obtain clear and complete information from each respondent on each variable that we wish to analyze.

III. To test question order. It is important to check the influence of order to be sure that certain questions are not influenced in an undesirable manner by preceding questions. Moreover, it is essential that the questions flow easily from one to another, forming a natural, conversational pattern. Too many sudden shifts confuse the respondent and have an adverse effect upon his co-operation.

IV. To test whether any important variables have been overlooked in the design of the study. At times, interviewing on the pretest will reveal through the thinking or experience of respondents that there is an important dimension that has not been recognized previously. The study usually will be materially improved by incorporating this variable into the design and securing adequate data on it.

V. To test whether the interview-form is constructed so as to obtain a high level of respondent co-operation.

In addition to having the questions worded in a vocabulary familiar to respondents and flow from one to another in an easy conversational manner, it is essential that the respondents feel that the questions asked call for information that they should supply. It is possible, of course, to start an interview by bluntly asking, "What is your income?" "How much money do you have in your checking account?" "How much in your savings account?" But to do so produces an antagonistic attitude in respondents and yields results of little value.

Over the past several years we have done a great deal of experimentation and have learned that to secure cooperation we must make clear to respondents why we want the information that is covered by the questions and why it is important they give it to us. And they must see it as important in their scale of values, not in ours. A step that helps to do this is to phrase the questions so that they are stated in terms of problems of concern and interest to the respondent. Thus, for example, the interview form on the Federal Reserve Study starts with the following questions:

1. Would you say you people are better off or worse off financially now than you were a year ago?
   1a. How is that?

2. Do you think that a year from now you will be making more money or less money than you are now, or will you be making about the same?
   2a. Why do you think so?

3. Now, considering the country as a whole, do

you think we will have good times or bad times or what during the next year or so?

　3a. Why do you think so?

4. What do you think will happen to the prices of the things you buy during the next year? Do you think they will go up or down or stay about as they are now?

5. Does the way you feel about prices make any difference in your plans to buy clothing and house furnishings and cars and things like that? In what way?

6. As I told you, this survey is largely concerned with saving and spending. Would you say that saving is more important or less important now than it was during the war?

　6a. Why do you feel that way?

7. What is your main purpose in saving? Do you have any other reason for saving?

(After question 7 the interviewer says to the respondent: "As I said, this is a financial and statistical survey. We are trying to get an accurate picture of people's financial situation all over the country. I want to go over this blank with you. The first thing we need to know is your income for the past year, and something about the different kinds of income you had." The interviewer then proceeds with questions about employment and income.)

In addition to designing the interview-form in such

a way that it facilitates a high level of respondent co-operation, it is essential that the interviewers have a good understanding of each study and its purpose. They need this information so that they can make clear to respondents the purpose of the study when they introduce themselves. They need it also in order to answer readily any questions that respondents ask.

One of the interviewers who worked on the survey for the Federal Reserve Board last year told us that he introduced himself about as follows: "With my $12,000 a year broker I used something like: 'You are of course familiar with the functions of the Federal Reserve Board in regulating inflationary and deflationary tendencies, both in the securities market and in the general economy . . . ' With a small commercial photographer it went: 'I don't know whether you know just how the Federal Reserve Board works and how much it can do to prevent inflation. For example, by regulating the banks, it can increase or decrease the amount of money in circulation, and you know that has a great deal to do with general business conditions . . . ' And with an elderly widow in poor circumstances: 'Nobody can tell whether we are going to have good times or poor times during the next year or so, and the Government would like to get ready to do what it can to make sure we don't have another depression . . . ' "

Our interviewers are instructed to ask all questions exactly as they appear on the interview form and to record fully the respondent's answers.[20] When a respondent fails to understand a question, the interviewer rephrases it to make it clear to the respondent, and when

that is done, the interviewer reports the rewording used as well as the respondent's answer.

After the final draft of the interview form has been turned over to the field staff to secure the necessary interviews, the study director and his assistants start putting the codes into final form. As fast as the completed interviews are returned from the field they are coded and a random subsampling of them are checkcoded. By the time the interviewing is completed, the answers are ready to be punched on cards for machine tabulation.

We place great emphasis on the design of the study and the process of analysis. We have, I believe, consistently spent relatively more money on this phase of our research than any similar research organization. We are convinced that this is a wise and necessary expenditure. Good research and useful results depend on good design. We know that we cannot take at face value the direct answer to direct questions. Consequently, we usually ask several related questions and often use an indirect approach. In the Federal Reserve Study we ask people what their plans are for the use of their government bonds and we also ask them elsewhere in the interview how they are going to finance the consumer durable goods they propose to purchase. The answers to one question helps to act as a check on the answers to the other.

A better illustration, perhaps, of the value and necessity of an indirect approach was obtained in some of our work for the Treasury Department. If, during the war, people were asked directly why they bought

bonds, most of them would reply with a patriotic answer such as "Uncle Sam needs the money," others would mention such reasons as, they bought bonds for their children's education or to buy a farm or home. Very few said they bought bonds because someone had asked them to do so, and yet because we suspected its importance and obtained measures to check, we found that being asked to buy was a very important factor affecting bond buying. In the Second War Bond Drive we found that one-quarter of the gainfully employed people had been asked personally to buy bonds. Of this group, 47 per cent bought more bonds during the drive than they had been buying. Of the three-fourths who had not been asked personally to buy, only 12 per cent bought more bonds during the drive than they had been buying. This relationship held for all income, occupation, geographic, or other groupings that we tested in our analysis. This finding was made use of effectively by the Treasury Department. They enlisted sufficient volunteers by the Third War Bond Drive to ask 50 per cent of the gainfully employed people to buy bonds. The sale of bonds to individuals, which was by far the most important reason for conducting War Bond Drives, showed a corresponding improvement: an increase from 2½ billion to 3½ billion dollars.

Accepting at face value direct answers to direct questions is a common and often serious source of error in some of the polls now being conducted. The danger of this error is being recognized increasingly.[15] It is essential to avoid this error through sound study design and interpretation.

SAMPLE INTERVIEW

The Use of Sample Interview Surveys

One of the major trends today, and one that will continue for several years, is the rapid increase in the wide variety of problems that is being studied by sample interview surveys. We have an opportunity here to consider only a partial list of the different kinds of problems which can be studied by means of this research tool.

Psychologists will recognize immediately the wide applicability of the sample interview survey in public opinion research. It can be used to measure how the public feels about an issue, what information or misinformation exists on the question, how people acquire their information and attitudes, the motives influencing their attitudes, and how these and similar matters differ among the different groups in the population. Thus, for example, we have just finished for Cornell University[28] a study of attitudes toward and knowledge of the atomic bomb and the Bikini tests and how much the latter influenced the former. We also covered in the same study attitudes toward and knowledge of the UN, Russia, and England. We found that one-fifth of the people had not heard of the Bikini experiments; that 30 per cent did not know what the UN is; that the people of the U.S. who know about the UN have a favorable attitude toward it and are hopeful with regard to its future. We found also that there are appreciable shifts in people's attitude toward Russia which vary with the degree of conflict or co-operation that exists at the moment in the world's councils. We also know that

the attitudes toward Russia of the better informed persons are more likely to shift with current developments than are the attitudes of the poorly informed.

In studying public reaction and behavior on major political problems both domestic and international, the sample interview survey can provide data which political scientists have long sought. These data, when analyzed quantitatively, will supplement existing knowledge with a body of systematic information based on accurate measurements. These measurements will increase the available knowledge on who votes and why; what people vote for and against; in what terms they see major issues; the influences that affect their thinking; and all the other major questions which must be answered in quantitative terms if we are to understand political behavior and to develop generalizations that are scientifically valid.

At the present time much of economic research consists of the collection and analysis of aggregate data, such as national income, farm income, total savings, ,or similar data. We have relatively little data on how these aggregates are distributed through the population. What persons or groups hold the savings that total the national aggregate? We have no accurate figures on the ownership of securities; we do not even know how many people own life insurance, or how concentrated or widespread the holdings of life insurance are. There are wide areas of important economic data, particularly on matters involving the individual or the family, where little information is now available.

Another serious gap in our knowledge of economic

phenomena is the lack of data on the motives affecting our economic behavior. If we are to have intelligent insights into the functioning of our very complex economy, and even more important, if we are to predict economic trends accurately, we need all the data we can obtain. Overall aggregates and elaborate extrapolations are important but so are data on the behavior of the units that make up the aggregate and on their attitudes, expectations, and motivations. Economists have been forced by the lack of other knowledge to assume that man is a rational being in his economic behavior. This assumption is, of course, completely erroneous and leads to serious errors of analysis and prediction. We need to know what peoples' attitudes are toward spending and saving; toward the use of particular forms of saving; toward the buying of particular kinds of products, such as homes, autos, etc.; what expectations they have with regard to their income and prices. We need to know what factors are influencing these attitudes and expectations and what underlying motives are functioning.[8, 9]

It is readily possible by means of the sample interview survey to obtain accurate information to meet many of the serious deficiencies that now exist.[18] The Survey of Liquid Assets that we did last year for the Federal Reserve Board (and are repeating again this year) was important because it obtained information never before available on the distribution of liquid assets and on plans for their use.[5, 19] The results of this survey were of widespread interest to economists and businessmen and resulted in changes in their thinking

and plans. The cushion of savings to permit continued consumption in case of a decrease in income appears to be less than was generally believed because the holdings of savings appears to be more concentrated than had been thought. When spending units were arranged in the order of the total amount of government bonds, savings accounts, and checking accounts they held, it was found that the top 10 per cent held 60 per cent of these liquid assets, and the bottom 50 per cent of spending units, only 3 per cent. The concentration of these holdings by income groups, however, was much less marked. The top 8 per cent of spending units having the highest income held only 36 per cent of these liquid assets.

It was found that people generally propose to hold on to their savings bonds and do not expect to use much of them for the purchase of consumer durable goods. In fact, in 1946 (and we will soon have the data for 1947) they planned to finance a surprisingly large proportion of their planned purchase of consumer durable goods from their income and by buying on the installment plan. Many persons prefer to buy on credit rather than use their bonds for such purchases. No wonder the substantial increase in consumer credit last year!

There is an increasing body of evidence pointing to the value of attitudinal data for making predictions of economic behavior. In the work we did for the Treasury Department we were successful in making predictions such as the trends in bond redemptions and in presenting data to show the forces influencing these trends. We were able to predict correctly the effect of the Victory (payroll) tax on the purchase of bonds

through the payroll savings plan. We were able to point to many steps, such as increasing solicitation, which would increase the amount of bonds purchased and held. The use of surveys to measure the forces influencing economic behavior and to provide data to help predict economic trends will become increasingly common in the years ahead. In this research, the economist, with his substantive knowledge, will utilize research teams which include with social psychologists who are skilled in survey techniques and who have a knowledge of human motivation based on scientific results.

Another broad area of research where surveys will be used increasingly is the field of social and group organization. The sample interview survey can be used effectively to discover the patterns of group organization, how these vary under different conditions and why, the relative effectiveness of different kinds of organizations for different kinds of functions, the principles of leadership that contribute to effective social organization, and countless other questions in this important area of social science.

Closely related to social organization are the fields of public and business administration. Here also the sample interview survey is a research tool of great value. It can be used to discover the relative level of employee morale and the conditions of leadership and organization which produce high morale and high productivity.[11] It can be used also to find how well government agencies are meeting the needs of citizens and how adequately the product or service provided by a business meets the desires of the consumer, what its deficien-

cies are and how they should be remedied. These are but a few of the questions that surveys can answer for administrators.[1, 2, 17]

We are just embarking on a major research program using survey techniques "to discover the underlying principles applicable to the problems of organizing and managing human activity." We shall be especially interested in discovering what principles of leadership have broad applicability. We suspect that the fundamental problems of leadership and organization are the same wherever human activity is involved. This appears not only to be a reasonable proposition but we have some evidence to support it.

Survey techniques have been used by agencies of the Federal Government to make government more democratic by making it more sensitive to the needs and desires of the people affected. The Department of Agriculture started this work in a small way in 1937 and made increasing use of it after 1939. These studies have helped to reduce forest fires, to increase food production during the war, to improve the effectiveness of nutrition education, and to promote many similar improvements. The Treasury Department had the Division of Program Surveys make many studies for its use in planning and administering the War Bond program. A volume describing this research and the application of the results is now being prepared by Dorwin P. Cartwright. Another illustration of the governmental use of surveys is the recent study for the Federal Communications Commission on the attitudes of rural people toward radio service. The F.C.C. had this study

done to guide it in establishing policies which would improve service for rural areas.[21]

The Army has made extensive use of survey research. Their program was established by General F. H. Osborne in the Research Branch of the Information and Education Division. It was under the general direction of Charles Dollard, Samuel A. Stouffer, Leonard S. Cottrell, Jr. and Carl I. Hovland. The results of this work are about to be published in a series of volumes under the editorship of Dr. Stouffer.

Another broad area where survey research is proving increasingly valuable is in the field of communication.[10, 21] At present we know all too little about such questions as where do people obtain their information on important questions; how can the level of information be increased most efficiently; how are the attitudes on crucial questions formed; and what is the relation of these attitudes to information or knowledge? Surveys are being done in this field, but there will be an increasing demand for this research in order that our democracy can intelligently and effectively meet the tremendous problems that lie ahead. All too little is known about how the media of mass communication actually function and how people want them to function. On each of the major questions on which decisions must be made in the years that lie ahead there will be serious need to know what people know about the issue, their attitudes toward it, and what they desire to see done. On many of these issues several surveys over a period of time may be required to study what methods of education are most effective in increas-

ing the general level of information on the issue. The rank and file of voters must become much better informed on major questions if our society is to deal intelligently with the problems we face.

The evaluation of education is closely related to communication. What educational methods are most effective in motivating students, conveying knowledge, developing sound attitudes and habits, and in otherwise meeting educational objectives? What differences are there in the effectiveness of methods for different age groups, including adult education programs, and for different kinds of subject matter? The sample interview survey has been used very little to gain answers to these questions. It can help, along with other research that is being done, to improve appreciably our educational system.

A particularly important area where survey research is especially needed is the area relating to all the problems that are faced in building a successful United Nations. To succeed, the United Nations must have understanding and effective support throughout the world. This may require widespread education and substantial cultural changes. The representatives to the UN and its administrative officers must be responsive to the genuine desires of all the citizens of the world. Its administrative staff must be efficiently organized. Sample interview surveys can be used as tools to help get these conditions. They can materially improve the probability of realizing the conditions required to achieve a successful United Nations.

There are many other areas of human activity where

the sample interview survey can be used to obtain accurate facts which will help solve the problems being faced.[22] For example, the problems that America faces in setting policy and selecting sound methods of implementing our democratic objectives in our occupation of Japan and Germany are tremendous. We can be much more likely to succeed in our basic objectives in the occupation, as well as to save substantial sums of money, if we guide our activity by careful measurements of results. By discovering, through measurement, what works and what does not and why, we can increase the probability of our successfully building a democratic foundation for development of those countries.

At times social scientists are likely to speak of surveys *or* experiments as though it were a question of one or the other. Nothing can be further from the truth. In fact, an excellent case can be made for the proposition that on many research problems the best work can be done only by using both interdependently. The steps usually involve a survey to discover the existing facts: what attitudes and behavior exist, what information is present, how was it obtained, what motives are functioning? On the basis of these and similar data an experiment involving changes in behavior, attitudes, knowledge, etc., is undertaken. After the experiment a survey is made again to measure what changes occurred and why, and perhaps to discover why other desired changes did not occur. Sometimes periodical surveys are made during the experiment to obtain data to guide any changes that may be needed. The sample interview survey actually is a scientific tool which can

be used in conjunction with the experimental method in social science and thereby materially widen the applicability of the experimental method. Often it is the best method for securing the accurate measurements that are required when using the experimental method.

As you can gather, I am enthusiastic about the future of the sample interview survey. So far as I have been able to discover, it is a valuable tool of research, useful in all areas of human behavior. I believe we can safely predict that this research tool, fundamental to all the social sciences, will have an increasingly wide application in the years that lie ahead.

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